

CONNECTING UNIVERSITY EARLY CHILDHOOD AND FAMILY EDUCATORS'  
EXPERIENCES WITH STUDENT IPADS THROUGH DIALOGICAL  
POSITIONING TO SHIFTING PEDAGOGIES AND CULTURE

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## DEDICATION

For my husband, Stan Masek, my children, Reese and Jack, and my Father, Barry Greenhalgh, for your never-ending patience and love as I worked my way through this lifelong goal.

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## ABSTRACT

NICOLE MASEK

### CONNECTING UNIVERSITY EARLY CHILDHOOD AND FAMILY EDUCATORS' EXPERIENCES WITH STUDENT IPADS THROUGH DIALOGICAL POSITIONING TO SHIFTING PEDAGOGIES AND CULTURE

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The purpose of this study was to explore the process of student iPad implementation using democratic tactics to influence teaching practices and emerging cultures of innovation. Students whose learning experiences manifested new considerations of iPads as future early childhood and human service practitioners determined culture shifts. The problems that prompted this research were threefold. The first was the dearth of evidence connecting democratic innovation tactics to subsequent teaching practices. The second was to make the process of shifting teaching practices that accommodate digitally mediated learning more visible. The third was lack of evidence of student perceptions about iPads enhancing learning, and subsequent considerations of iPads for working with young children and families in professional settings that suggest the development of a culture of innovation.

To address these issues and this phenomenon taking place at Texas Woman's University with three university professors and their students, multiple ethnographic methods were employed. Interviews, classroom observations,

reflexive journals, weekly debriefing meetings, and focus groups provided substantial data over the course of 1-year. I used NVIVO, a computer assisted qualitative data analysis system (CAQDAS), to code and analyze using Matrix Coding, Cluster Analyses, and Word Frequencies.

Findings showed connections between professors' democratic experiences during their implementation process and shifting teaching practices. Further, the dialogic negotiations that took place during their exploration of student iPads illustrated how dialogue within a small community could support appropriate and practical teaching practices in university early education and family and consumer sciences courses.

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## CHAPTER I

### INTRODUCTION

Cultures shift in all levels of education as mobile technologies and digital spaces take presence in the ecologies of individuals' lives. In response, educators find themselves having to take action to advance their practices in the classroom, using progressive pedagogical techniques. Digital aptitude, interests, needs, and contextual considerations of educators vary; therefore, the process of technology integration must address change with mobile technologies for teaching and learning democratically (Dahlberg & Moss, 2004; Morrow, 2009; Nordin, Mohamed & Melor, 2010; Opler, 1945; Santos, 1995; Sharples, 2005; Traxler, 2009).

There is need for additional evidence of democratic innovation in educational fields to operationalize the concept for educators (Morrow, 2009). Although a spectrum of teacher choices compromises time and standardized systems, authentic buy-in is optimized because human agency is prioritized during the innovation process (Dewey, 1903, 2008; Hammerness, Darling-Hammond, & Bransford, 2005; Morrow, 2009). Taking inventory of the change process implementing technology allows educators to account for successes or struggles and makes necessary adjustments that are contextually relevant to themselves and the students they serve (Harwell, 2003; Herrington, Herrington, Mantei, Olney, & Ferry, 2009; Hogue, 2012). Further, students' evolving considerations of technology use

for teaching and learning within these contexts influences the culture of the institution in which these considerations are rooted, leaving impressions on the children and families whom these students will teach and advocate for in their professional futures (Sharples, 2005).

The genesis of this dissertation, its significance to the early education field, and the theoretical framework as it pertains to the research questions and researcher's paradigm are discussed in this chapter. Definitions of key terms are provided to guide the reader through each chapter and to situate both the research and reader to the dialogical innovation concept presented here.

### **The Study**

This ethnographic project is an investigation of the experiences of three university professors, who have been referred to as technology leaders in their department, since they are exploring newly acquired student iPads in the Family Sciences Department at Texas Woman's University (TWU). Inventory of this process has been executed through a collection of dialogic exchanges within themselves and among their self-determined team (Aveling, Gillespie & Cornish, 2014; Bakhtin, 1981a; Shields, 2007). Professors' experiences as learners in a bottom up pedagogical shift toward mobile technology use with students preface student opinions about their experiences with iPads in class. Collectively, these experiences, opinions, and considerations are an exploration of the suitability of mobile technologies for learning within context of Early Childhood and Family Science courses at the university level.

## **Background**

In 2013, Texas Woman's University leaders established a 5-year Quality Enhancement Plan (QEP), *Pioneering Pathways: Learning By Doing*. The primary goal of this program has been to enhance learning through active student engagement in experiences that are practical to current real world situations. Technology integration is one area that has become a focus to meet this goal in the Family Sciences Department, which is spearheaded by a few technologically proficient faculty members.

Technology diffusion in classroom settings prompts a realignment of the agencies of change, shifting the culture of institutions and student perceptions about technology-mediated learning (Cochrane, 2010; Dewey, 1938; Dooley, 1999; Gee, 2000; Herrington, Ostashewski, Reid, & Flintoff, 2014; Rogers, 1962). This perspective stems from my experiences as a graduate research assistant during an iPad grant study at TWU (Jackson, Snider, Masek, & Baham, 2013). Our objective for that project has been to expose the faculty to iPads and mobile learning applications ("apps"), for them to explore these at their leisure, and for them to report to our research team their experiences and uses, both personally and professionally (Jackson et al., 2013).

During that time, I was involved in exchanges that had taken place between researchers and participants, propelling my view on social constructs and agency for shifting teaching practices with mobile technologies. What piqued my interest further are professors' choices of pedagogical applications and implementations

that do and do not take place. My reflexive self wonders why there are such varying implementations among faculty sharing similar experiences.

Findings vary by participant, but what is surfacing from the project itself is an emerging culture of diversified teaching practices using 2.0 technology tools. The support of the research team throughout the 2-year project has addressed individual needs rather than departmental agendas, affording diverse, creative, and contextually relevant iPad uses. iPad uses have been deemed pedagogically sound for particular purposes and have been implemented in differing ways by the faculty themselves. This has led leaders of the department to consider a wider allocation iPad usage to practicum students, including 40 iPads designated for Family Sciences students in the classroom setting.

In 2015, a grounded research project led by three Family Sciences professors ensued. Their exploration of student iPads in Early Childhood Development and Education (ECDE) and Family and Consumer Sciences (FCS) courses, with no set agenda or preconceived notions of their affordances, has set the stage for the next layer of democratically generated cultural shifts. I proposed that a separate but related research project be conducted to add rigor and to explore democracy to a deeper level. I gained a broader perspective of this bottom up, socially constructed phenomenon by taking inventory of the process through lenses that are both democratic and dialogic. I hope to reveal the influences of democratically implemented student iPads in the classroom. Additionally, students' considerations

about iPad use with children and families imply an emerging culture of innovation on this broader scale.

### **Problem Statement**

The problems addressed in this study are threefold. First, there is a lack of evidence of the experiences of individual educators' democratic exploration with student iPads on their evolving teaching practices in student tech-in-hand dynamics. Second, there is dearth of evidence on how the process of continuous internal and external negotiations about iPad uses shapes teaching practices. An offshoot of the resolve to find progressive ways to enhance learning experiences is to identify teaching practices with iPads that 1) assist educators in meeting objectives, 2) align with the educator's paradigm, and 3) satisfy individual determinations to innovate. Third, there is a lack of research on the relationship between shifting pedagogies with iPads and student opinions about technology-mediated learning. To address these three vacancies, I propose that democracy be explored as a viable avenue for an iPad implementation process which influences emerging cultures of innovation as manifested as new considerations of iPads for future early childhood and human service practitioners.

### **Significance of the Study**

There is no established definition or structure for democratic innovating with mobile technologies, which makes it difficult for researchers to examine influences on teaching practices and student considerations of mobile technologies for learning. This study is progressive and includes a new formula for ascertaining

influential factors that connect current research on bottom up innovation (Hogue, 2012) to experiences and human agency for pedagogical change with the use of student iPads.

Ultimately, I propose a new innovation process that is flexible, meaningful, and contextually designed from the bottom up by educators with potential to proliferate by means of new considerations of iPad for future educators and advocates of children and families. This new understanding of innovation as a unique process allows professors and students to employ democracy as a tool to use when they face even newer technologies in time.

### **Theoretical Framework**

To get to the core of how educators experience democratic innovation and the effects of these experiences on their teaching practices and student opinions of innovation at TWU, four theoretical components are layered into this framework: Democracy, Dialogism, Innovation Texts, and Culture of Innovation (Bakhtin, 1973; Dewey, 1903; Shields, 2007; Sharples, Taylor, & Vavoula, 2007).

#### **Democracy**

Democratic innovation tactics are descriptors of educators' experiences as they have chosen what and how to innovate their teaching practices with student iPads (Dewey, 2008; Morrow, 2009). Their independent and collective choices throughout the innovation have illustrated this as an ongoing process.

## **Dialogical Self Theory**

The use of the *Dialogical Self Theory* (DST) makes the process of determining appropriate teaching practices more visible through negotiations on various aspects of traditional and tech-in-hand practices (Bakhtin, 1973, 1981a, 1981b). DST has two parts: dialogic voices and dialogic relations. Voices are professors' opinions or positions on a topic (Shields, 2007). Relations refer to the actual teaching dynamic being traditional or technology-mediated (Shields, 2007). Dialogue is said to be dialogic in nature because positions or voices on any given topic change as new information and insights are gained (Bakhtin, 1981a; Shields, 2007).

## **Texts**

The third component are texts or teaching practices that use voices to negotiate contextually suitable uses of student iPads. Texts are categorized under the National Education Technology Standards for Teachers (NETS-T), nationally recognized guidelines for K-12 educators incorporating technology in their classrooms with students. These have been used in this research, so a number of teaching practices are categorized succinctly and are applicable to varying contexts (ISTE, 2002). This categorization strategy adds rigor in three ways: applicability, consistency, and neutrality (Guba, 1981; Krefting, 1991). *Applicability* means that this research can adjust to fit various education contexts. *Consistency* suggests repeatability of methods. *Neutrality* is the effort of the researcher to maintain a degree of objectivity in data collection and analysis (Guba, 1981; Krefting, 1991). Given my relationship with the professors participating in this study and my

familiarity of the Family Sciences culture, it is necessary to incorporate this component to maintain these three important qualities.

### **Culture of Innovation**

The fourth component, *culture of innovation*, is a conceptualization of how the ecologies of technology influence thought, consideration, and action with those technologies (Sharples, 2005; Sharples et al., 2007). Mike Sharples is an education mobile technology author and theorist, who avows mobile learning theories that are culturally embedded and continuously evolving; thus, his support for democratic designs are flexible for globalizing communities (2005; 2007; et al., 2007; Sharples, Arnedillo-Sánchez, Milrad, & Vavoula, 2009). In this study, culture of innovation represents collective student perceptions about technology-in-hand (tech-in-hand) pedagogies in ECDE and FCS courses. Student considerations of iPads for their professional repertoires are the apex of tech-in-hand teaching praxis and suggest a proliferation of iPad functions and applications in professional contexts with children and families (Lather, 1986; Sharples, 2005).

### **Research Questions**

I have found three connections in this ethnographic investigation: educators' democratic innovation experiences and teaching practices, teaching practices (texts) to the negotiations that have influenced them, and cultural shifts toward innovation to student input of learning experiences with and considerations of iPad usage. Three research questions touch upon this broad conceptual shift toward democratic innovation processes, the agency of educators to lead change, and the influence of

these experiences on student perceptions and considerations about iPad mediated teaching and learning.

Research Question One: What did educators experience during the process of exploring student iPads, and how did that evolve teaching practices in their Early Childhood Development and Education and Family and Consumer Sciences courses?

Research Question Two: How did educators' dialogic experiences exploring the use of student iPads for Early Childhood Development and Education and Family and Consumer Sciences courses influence the process of integrating iPads into their teaching?

Research Question Three: How are student perceptions and considerations of teaching and learning with iPads in their Early Childhood Development and Education and Family and Consumer Sciences courses linked to emerging cultures of innovation?

## **Definition of Terms**

### **Dialogical Self Theory**

Mikhail Bakhtin (1895-1975) conceptualizes the self as an intricately woven dichotomy of multiple selves that, through dialogue, interconnect individuals and society. This composite self draws from conversations in the external world to develop a sense of self within each individual person. These selves have an ever evolving and symbiotic influence on the environments in which they reside.

Hermans and Hermans-Konopka (2010) expound on DST, stating that the self-

society interconnection is more than its physical encapsulation; it is limitless and affords the “opportunity to profit from the richness and creativity that the individual human mind has to offer to the innovation of existing social practices” (p. 1). Within the context of this study, DST frames the educator-technology dichotomy through internal dialogue in reflexive journaling and conversations with colleagues and students. Products of these discussions actualize the teaching practices they employ.

### **Voice**

*Voices* represent professors’ multiplicity of selves or positions on given topics within context that stemmed from previous experiences, voice of self or by others in a discussion, which is voice of others. Using Aveling et al.’s (2014) Bakhtinian methodology, voices are captured in the language within reflexive journals or in conversations with colleagues and students. This language sample demonstrates this approach of Bakhtinian discourse analysis: “I think using iPads for developing literacy (topic) in early childhood classrooms (context) should be open-ended (position; voice of self). Professor X (voice of other) has been using the ABC Spy app, but it is closed-ended.” From this conversation, the speaker negotiates using the ABC Spy app, but is conflicted by its closed-ended design. This is a dialogic conversation between two voices to determine a teaching practice or text with iPad usage.

### **Text**

*Text* is “a structure that reflects a cultural product that is subject to critical analysis” (Shields, 2007, p. 66). Text, in this study, refers to teaching practices that

are part of the innovation conversations taking place within one's self and with others or dialogues. For example, using student iPads in the classroom to communicate and to reflect are two separate texts within the broader text of mobile device affordances.

## **Dialogue**

*Dialogue* is the means to/end point of deciphering voices (Shields, 2007). To Bakhtin (1981a), dialogue is more than just talk, it is ontology and a way of being that welcomes differences among voices to improve or to extend one's self. Dialogue relies on juxtaposition because, in a dialogical sense, without opposition there is no movement, no change, and no expansion of repertoires. Bakhtin states, "A single voice ends nothing, and resolves nothing. Two voices is the minimum for life" (1984, p. 252). His ontological stance on dialogue applies to all aspects of life, all peoples, and all contexts and is the source of self-consciousness (Shields, 2007, p. 65).

Bakhtin (1973) did not believe the dialogical nature of humans and that their multiplicities are fully understood in social sciences because universal efforts to interpret and to define phenomena are the antithesis of dialogue, which a constant pursuit of truth. He further states, "When the dialogue is finished, all is finished. Therefore, the dialogue, in essence, cannot and must not come to an end" (1973, p. 213). Dialogue is, therefore, the apex of exploration and self-discovery because multiple facets of each person are engaged to find truth. Bakhtin (1973) describes speakers in dialogue as "not solitary, not unitary, but embedded in the chronotype

of time and space and always bring[ing] with him or her a multiplicity of possible meanings, voices, and identities” (Shields, 2007, p. 39).

### **Autodialogue**

*Autodialogue* is juxtaposition in a dialogic conversation with *one's self*, between two contextually opposing points of view or voices. For example, an educator may believe that technology use by young students is progressive and the next pedagogical step toward a digitally literate citizenry, but as a parent he or she may deem technology as inappropriate for children at home. This internal negotiation process influences his or her resulting decisions.

### **Heterodialogue**

*Heterodialogue* is negotiation between one person's voice(s) and the voice(s) of others within a dialogue on a text. For example, one educator describes an iPad application that has been used in a classroom of 5-year old children to another educator (voice of other). Juxtaposition resides in the second educator's statement that these apps may not be appropriate for 3-year old children (voice of self). The resulting decision to use this app or not is attributed partially to this negotiation process. Conversely, this negotiation influences the first educator's beliefs about how *he* or *she* determines appropriateness, and thus, the dialogue continues. An extension of this dialogic exchange are the children who witness their teacher's practices with and without technology that influence their thoughts, considerations, and actions with technology in other settings and remains a signifier of a culture of innovation.

## **Heteroglossia**

*Heteroglossia* is Bakhtin's (1973) term representing multiplicity of voices, which is aggregated to form one's mosaic perspective on a text. This is likened to personality that forms over time in response to various stimuli and is contingent on the ecology of experiences. Using the example above of the educator and parent negotiating appropriate iPad usage, although each voice is in opposition to one another (educator voice vs. parent voice), they are unified and comprise the heteroglossia of that person in regard to that particular text containing its own meanings and nuances (Hermans & Hermans-Konopka, 2010). Multiplicity is, therefore, inherently dialogic.

## **Dialogic**

*Dialogic* is the activity between voices. One example that Bakhtin (1973, 1981a) refers to frequently is the difference between comprehension and understanding. To comprehend requires one voice and one receiver of the text; dialogue between voices is absent. This is commonly seen in hierarchical innovation systems and is not dialogic. Understanding requires the negotiation of meaning between voices; one voice enters the dialogue with its preconceived notions and another that emerges from dialogue since the participant becomes part of the meaning during the negotiation (Shields, 2007, p. 123). In social science, the researcher is subject to dialogic encounters when he or she analyzes data, weaving his or her interpretations into the fabric of findings. This concept is linked to

Schwandt's (2007) hermeneutic contextualism - the interpretation of meaning within context contingent on the researcher's own voices.

### **Dialogic Relation**

*Dialogic relation* is the exchange between voices to seek truth (Bakhtin, 1981b). Bakhtin (1973, 1981a) refers to this in his analyses of novels and the characters by virtue of dialogic relationships, such as love/hate, antagonist/protagonist, and hero/villain. In this study, relations are traditional or tech-in-hand teaching practices. Negotiation is determining which tactic is best for particular purposes (Hermans & Hermans-Konopka, 2010; Shields, 2007).

### **National Education Technology Standards for Teachers (NETS-T) Factors**

The teaching texts of this study are categorized under the five performance indicators for educators using technology for teaching and learning. These factors are guidelines for K-12 educators to improve learning with technology by engaging students and providing a model of digital fluency in classrooms developed by the International Society for Technology in Education (ISTE) (2002). The NETS-T factors were designed by the International Society for Technology in Education in 2002, and include:

1) Facilitate and Inspire Student Learning and Creativity (Factor One). This element referred to modeling innovative thinking, contextualizing problem solving, promoting reflection, and collaborating in the construction of knowledge in a community across various platforms (ISTE, 2002).

2) Design and Develop Digital-Age Learning Experiences and Assessments (Factor Two). This element included contextualizing learning to promote creativity and a culture of technology-enriched learning, learner-centered activities to stir curiosity, evaluation and self-assessment (ISTE, 2002).

3) Model Digital-Age Work and Learning (Factor Three). This element referred to digital fluency for transference of knowledge to various contexts, collaboration across various platforms, contextualized learning with digital tools, and modeling resourcing with digital tools (ISTE, 2002).

4) Promote and Model Digital Citizenship and Responsibility (Factor Four). This element reflected employing diversity, ethically sound practices, and global cultural awareness with digital media (ISTE, 2002).

5) Engage in Professional Growth and Leadership (Factor Five). This referred to advocating for community development around technology, developing leadership skills through mentoring, ongoing reflection, and contributing to the vitality of the teaching profession and school community (ISTE, 2002).

### **Researcher Paradigm**

It is important to include my own paradigm of teaching and learning to provide transparency and truth-value to this study. By doing so, I am disclosing my biases, my own heteroglossia of teaching texts, and the influence of democracy that has inspired much of my research. I speak from a paradigm of an early

childhood educator, advocate, and specialist in development and education, but these ideas are extended to all learners, cultures, and learning dynamics.

### **Relationships of Shared Power**

I believe teachers and children are partners in learning who are living in a diverse world of inquiry and discovery. This symbiotic relationship is built on mutual respect, democracy, and a joint quest to seek truth. Authentic learning comes from true interest; therefore, it is the responsibility of teachers to make learning about the world interesting and relevant. In this fashion, learners organize their experiences and interpret them within their repertoire of meaningful things. Learning becomes intrinsically valuable by virtue of this dynamic.

### **Environments for All**

Learning is a process by which all senses are engaged to make new connections, which reinforces the notion that learning environments are most effective when they support diverse populations with varying interests and abilities. These safe places to explore, to act upon inquisitive instincts, and to elicit independence and creativity cannot be matched by any standardized practice.

### **Technology has a Presence**

Digital modes of accessing information to support learning in globalizing communities evolve with time and practice. In these spaces, a child views the world through a screen, but that has its dangers. Teachers must guide children

toward healthy digital citizenship and model ethical practices in purposeful and practical ways. Taking an ecological stance on digital citizenship, I believe each layer of a child's life is strewn with technologies, so to remain viable sources of information technology must have a presence within educators' pedagogies.

### **Listen and Question**

Learners are not blank slates to be drawn upon, tabula rasas or empty vessels to be filled, or seekers of empowerment; they come readily equipped upon entering the learning environment with preconceptions, unique experiences, innovative ideas, opinions, divergent thinking abilities, and a sense of power of their own. Pedagogy of listening fosters individuality, whereby each scenario, each interaction, and each feeling expressed must be viewed as unique and important (Dahlberg & Moss, 2004). This perspective requires extensive observation, dialogic communication among all parties invested in learning, and questions *not* answers so new meanings emerge, and ideas are cultivated. Through this cooperative process, learning becomes a product of human agency and imagination.

### **Summary**

In this chapter, I introduced bottom up, democratic innovation in education research in response to burgeoning mobile technologies that shift pedagogical practices (Baran, 2014; Barrett-Greenly, 2013; Bayar, 2014; Sharples, 2005; Traxler, 2009). The theoretical framework placed innovation into a series of dialogic

relations among educators to answer three research questions premised on connections between innovation experiences and cultural outcomes (Bakhtin, 1973; Dewey, 1903; Sharples, 2005).

Through the lenses of my paradigm of democracy and shared power, I introduced interconnectedness between the process of technology integration and considerations of technology by future early educators and human service practitioners. Professors' and students' experiences with iPads that are embedded in how they plan to use mobile technology imparted a shared meaning making process with this new digital tool for teaching and learning. Each individual engaged in this project underwent her own process and engaged in endless dialogues, which ultimately determined for him- or herself if and how iPads were suitable in various contexts with children and families. The next chapter highlights successful democratic education innovations, historical accounts of methods used to innovate in the past, and the theoretical framework of this study, which explores shifting paradigms away from generalized models for acceptance toward conceptual changes through dialogism.

## CHAPTER II

### REVIEW OF THE LITERATURE

In this study, I investigated how three university professors implemented student iPads into their Early Childhood and Family and Consumer Science courses at TWU. Their implicit and explicit languages were viewed to capture dialogic processes that had influenced their decisions of appropriate teaching practices using iPads. The final piece was to investigate if a culture of innovation emerged from students' considerations about iPads as learners and as future educators or human service practitioners. Searching the literature and understanding the current landscape of iPad integration in various levels of education and the theoretical underpinnings support this research endeavor, which addresses each of these elements.

I have reviewed democratic innovation tactics emerging in education research, the historical evolution and synthesis of common innovation models since the 1960s, and throughout the theoretical framework housed in a trifecta of democracy, dialogism, and culture. I have highlighted bottom up strategies for mobile technology integration in all levels of education that prompt paradigm shifts in new directions (Dewey, 2008; Dooley, 1999; Morrow, 2009). It is essential to draw upon common frameworks that have evolved since the introduction of 2.0 technologies to gain a better perspective of the innovation terrain. Using the

theoretical framework of this research, I positioned this intrinsically driven shift away from hierarchical structures of change to a dialogical evolution of teaching practices manifested through a process of negotiation and human agency (Afshari, Bakar, Luan, Samah, & Fooi, 2009; Bakhtin, 1981a, 1981b).

Democracy is developing new meanings in light of globalization that touches upon every level of education (Dewey, 2008; Hermans & Hermans-Konopka, 2010). Democratic innovation is aligned to what Santos (1995) refer to as “emancipatory knowledge,” which is the freedom one gains by acquiring knowledge that can only come from an internal place, a bottom up structure of development. Lefoe, Olney, Wright, and Herrington (2009) describe the democratic process of innovating as a series of “complex tasks” that need to be explored over a period of time rather than a number of hours of learning with technology if it is to be authentic (p. 18). For the purposes of this research, Dewey’s (1903) democracy is upheld as the root of choice and the platform upon which human agency impacts paradigm shifts in learning.

### **Overview of Topics**

This chapter is comprised of several sections that build a foundation for my proposal of democratic tactics for innovative teaching and learning with mobile technologies in Early Childhood and Family Science courses. I explain how democratic tactics included in this review are a posteriori, which is determined by an observable presence in the literature in the Review Methods section (Muller-Merbach, 2007). Also, an audit trail is provided to describe the path that led to the topics chosen.

I explain the philosophies of Dewey (1933) and Morrow (2009) and how these philosophies were placed in the context of innovation in education. The lens through which the concept of democracy was viewed is explained in order to maintain cohesiveness and consistency throughout this report.

Democratic Tactics Implementing Mobile Devices is broken down into three subheadings. *Bottom up Innovation* provides evidence of the effects of choosing to innovate (Cochrane, 2010; Hogue, 2012). Elements of bottom up innovation include the importance of a sense of ownership in the process, context to determine appropriate uses of iPads based on teaching objectives, and fostering learner-centered practices (Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012; Harris & Hoffer, 2009; Sharples, 2005). The second subheading, *On-going Support*, examines the literature on collaboration, community building, and mentorship during an innovation process and mitigates barriers through these support systems (Drouin, Vartanian, & Birk, 2014; Efaw, 2005; Eichenlaub, Gabel, Jakubek, McCarthy, & Wang, 2011; Hogue, 2012; Lefoe et al., 2009). The third subheading is *Reflection* to explore reflective and reflexive practices that relate to determining teaching practices using technology (Baran, 2014; Dewey, 1904, 1933; Herrington et al., 2009; Kazempour & Amirshokoohi, 2008). These three areas are explained in the Review Methods section. The purpose is to substantiate democratic strategies for innovating educators and students who aspire to work with young children and families.

I review frequently referenced models in the literature that have been used to innovate with mobile technologies in the Common Models for Innovation in

Education section. I conclude with a discussion of conceptual change versus concrete models (Dawson, 2007; Sharples, 2005, 2007; Sharples et al., 2009).

Theoretical Framework describes the Dialogical-Self Theory (DST), which interprets teaching practices through a specific voice that anchored appropriate teaching practices in context (Bakhtin, 1973, 1981a, 1986a, 1986b, 1986c). A brief explanation of Sharples' (2005, 2007, et al. 2009) culture of innovation provides a general understanding of how effective democratic tactics influence student opinions about their learning experiences and subsequent considerations of iPad usage for their professional futures. The chapter concludes with a summary of the review and theoretical framework to which establishes the foundation for the research methodology.

## **Review Methods**

### **Parameters for Article Inclusion in This Meta-Analysis**

To gain a deeper understanding of democratic tactics utilized in the implementation of mobile devices, I reviewed over 175 journal articles and books to develop this synthesis. I found all articles on EbscoHost, GoogleScholar.com, and ERIC databases, or by instructors during my matriculation at Texas Woman's University (2011-2016). Key search terms or phrases are: *democracy in education, integrating iPads into early childhood classrooms, iPads in higher education, m-learning frameworks, m-learning pedagogy, mobile device teaching practices, mobile learning theories, non-traditional professional development, professional development with iPads, resistance to innovation, and barriers to technology integration.*

There are three primary criteria for article inclusion. First, the journals had to be scholarly and peer or blind reviewed and published within the timeframe of 2.0 technologies of the 21<sup>st</sup> century (Machi & McEvoy, 2009). A few seminal research studies are included for the purpose of establishing a foundation for future works executed by contemporary researchers. The purpose for this criterion is to ensure current scholarship that is situated within the context of innovation in education as it is seen today, particularly concerning mobile interactive technologies (IT) (Creswell, 2011). The second criterion is the perspective of educators and their experiences with innovation including, but not limited to, mobile technologies. The purpose of this criterion is to maintain a focus on gaining insight and developing a pattern of pedagogical practices and concepts with mobile technologies for *educators* (Patton, 2002). The third criterion is the topic of the article, delineated within the abstract, examining mobile technologies for pedagogical purposes (Saldana, 2009). The reason for this criterion is to narrow the scope of phenomenology of innovations to mobile devices in the classroom (Patton, 2002).

Innovation Frameworks with iPads was based on 39 articles located on EbscoHost, GoogleScholar.com, and ERIC databases. The key search terms are: *democratic innovation, education innovation frameworks, implementing iPads in classrooms, technology implementation tactics/techniques, supportive innovation, and theories of innovation.*

In addition to the three primary criteria for selection of the journal article, there are two additional subsequent criteria. First, the article had to address the

idea of developing a framework for innovation in education, containing a portion of the discussion on tablet technologies. The purpose is to develop a sense of how innovation occurs in face-to-face, online, or hybrid dynamics and in various education levels. Although professional development plays a substantial role in technology adoption in classrooms, it is important to explain that the focus is more on experiences of educators and the subsequent sustainability of mobile technology integration rather than the mechanics of professional development systems. Second, the article includes an author's discussion about teaching styles and/or teaching objectives. The purpose for this criterion is to explore and to expound on the diversity of educators' teaching practices that warrant broader descriptors of effective, sustainable, and situated uses of mobile devices. By honoring the perspective of educators, and the practices they deem appropriate for their subjects, students, cultures, and objectives, the literature better addresses and supports the purpose of this research to explore the pedagogical practices with mobile technologies in the classroom in authentic and democratic fashions (Creswell, 2011).

Dialogical-Self Theory (DST) is a key component to the framework and methodology of this study and includes seminal works by Mikhail Bakhtin (1973, 1981a, 1986a, 1986b, 1986c), meta-analysis by Carolyn M. Shields (2007) and research by psychologist, Hubert Hermans (2001). I obtained these articles from instructors during my doctoral matriculation at Texas Woman's University (TWU) (2011- 2016) and from Open Access ERIC databases. Key search terms are: *Bakhtin*,

*dialogical-self theory in education, dialogical-self positions, dialogical-self theory and technology, I-positions, personal position repertoires, and self-confrontation methods.*

The parameter set for inclusion is the author's application of DST to education settings with a perspicuous applicability to diverse persons. The nature of this theory and the purpose for this criterion investigate practices determined by dialogic negotiations of educators who choose between digital or traditional methods when considering the environments, content, and student needs. Further, this focus affords applicability to a variety of specializations, particularly future early childhood pre-service teachers and human service practitioners who comprise the courses exploring student iPads for this project.

### **Audit Trail**

This review requires both inductive and deductive systems for refining themes due to the wide spectrum of innovation strategies occurring in all levels of education. I reviewed each article to determine if it fell within the parameters for inclusion as listed above (Machi & McEvoy, 2009).

During the inductive system review, I charted overarching themes that emerged from the research literature as quick reference guides (Bernard & Ryan, 2010; Saldana, 2009). Bernard and Ryan (2010) refer to this system as KWIC (Key-Words-In-Context), a means for identifying core ideas within substantial amounts of text (p. 65). Once I charted all articles, the deductive method eliminated themes that did not saturate the literature. Morris Opler (1945), an anthropologist, asserts that cultural systems consist of interconnected themes and determines their importance

depending on frequency, pervasiveness across diverse populations and practices, reactions to omission of the theme, and the impact of context upon the expression of the theme (Bernard & Ryan, 2010). Opler's (1945) view of theme inclusion is consistent with democratic innovation schemes because they transpose from the data, and they reflect the cultural system that evolves in education in response to global economic demands. Further, the purpose of this research is to highlight effective, sustainable, and contextually relevant innovation practices; therefore, recurrence of these democratic elements demonstrates a global phenomenon. On the other hand, the omission of themes potentially elicits alternate experiences during innovative process, while context influences individual experiences (Bernard & Ryan, 2010; Opler, 1945).

### **What is Meant by “Democratic”?**

Innovation agendas typically are implemented as mandates from education administrations, intended to address new teaching practices to improve student outcomes through episodic professional development programs (Borko, 2004; Sparks & Loucks-Horsley, 1989). A substantial amount of literature is available discussing traditional professional development frameworks and subsequent resistance by educators to seemingly irrelevant, top-down mandates (Bayar, 2014; Kazempour & Amirshokoohi, 2008; Ozdemir, 2013; Zhao, 2013). Without delving into a discussion about the prevailing failures of professional development strategies that are outside the scope of this research, some key features of

democratic non-traditional professional development schemes and their positive relationship to sustainable innovation are described.

The topic of innovation in education draws upon many areas of research including resistance, change, best practices, policy, and professional identities. Although they are not central to this research, they warrant mention in order to establish an accurate depiction of the process of innovation for educators. My thoughts in this section are based on two texts: *Democracy and Education* by John Dewey (2008) and *Bounds of Democracy: Epistemological Access in Higher Education* by Wally Morrow (2009). The aforesaid mentioned texts above provide the foundation for democratic processes in diverse educational contexts that are more conceptual than procedural in nature, which is consistent with the theoretical framework of this research.

In many of Dewey's (1904, 1933, 1938, 2008) writings, he eludes to the establishment of democratic societies through education systems that develop individuals' emotional, moral, and intellectual repertoires. He asserts that a shared interest among members of a community manifests into a collective freedom and equality among its constituents. Democratic dynamics of growth through shared meaning-making supports evolutions of societies' precepts. In this manner, change without disorder is more feasible. Innovation in education represents a major change in education, both resisted and facilitated by members within a society, that can be central to establishing current education cultures, which Morrow (2009) described as "moving a cemetery" (p. 28). To redefine the beliefs and practices of

educators is no easy feat, and to be successful, one by one, their individual paradigms must be exhumed.

Expectations of digital literacy in a global arena are predictably causing attention in education, which is countered by systematic redress of best practices incorporating technology. The problem is that technological innovation in education cannot be implemented in traditional fashions because personal investments are involved (Dewey, 1933, 1938, 2008; Morrow, 2009). Dewey (2008) explains, with great insight, that there is an imbalance between the ways in which people learn, and the dynamics in which information is imparted. He stated, “The permanent social interests are likely to be lost from view. Those which have not been carried over into the structure of social life, but which remain largely matters of technical information expressed in symbols, are made conspicuous in schools” (Dewey, 2008, p. 13).

Hierarchical formats for developing digital skills are ineffective if they do not match educator’s paradigms, and the meaning behind the innovation remains questionable and fragmented. In this regard, teacher identity plays a role. According to Randelović and Živković (2013) teachers’ professional identities are integrative and have a natural characteristic of “pedagogical and professional integrity and ethos” (p. 647). Izadinia (2013) delves deeper into this topic and acknowledges the relationship between identities and teaching practices, content foci, connections educators make with students and colleagues, and their motivations seeking professional development opportunities (p. 695; Gee, 2000; Hammerness et al.,

2005). Educators' identities, both personal and professional, overlap contingently; therefore, mandated innovation present both personal and professional concerns (Hall, Newlove, George, Rutherford, & Hord, 1991).

If the goal of innovation through professional development prepares educators to meet the needs of millennial generations, then a viable policy in higher education must balance aspects of educator individuality, such as skills, interests, objectives, and development policy (Morrow, 2009). Wolpe (1995) admits that this slows the process of development, but it is worth the time in the long run. He claims, "It is a shallow and myopic educational policy that proceeds as if the simplifying maneuvers of distributing the material resources for education more equitably will accomplish either equality or development" (Wolpe, 1995, p. 26). By virtue of maintaining the integrity of education agendas, particularly innovation, it is imperative that these intrinsic qualities of educators be addressed if a cultural shift integrating technology is to succeed (Yelland, 2009). Further, at the early education levels, when safety and appropriate practices are of utmost concern, educators must be well versed in the applications proposed to support their pedagogy (Dahlberg & Moss, 2004; Sharples, 2007; Yelland, 2009).

It may appear that training is an endless task, considering ever evolving technological capabilities of mobile devices (Bayar, 2014). Dewey (1904, 1933, 1938, 2008) maintains that education, in its truest form, is growth. Growth is not a static phenomenon, but rather it is a continuous process of knowing, adjusting knowledge, and applying knowledge to varying scenarios. If educators are able to

use individualized lenses of the innovation to create meaning of it, then its application in future innovations are accommodated more easily (Dewey, 2008). Dewey (2008) asserts the need to provide continuous development for educators, and every effort must be made to make current exercises as rich and pragmatic as possible. When the present blends into the future, “the future is taken care of” (Dewey, 2008, p. 53).

Researchers and education specialists triangulate combinations of technology, pedagogy, accountability, and paradigm to meet innovation demands (Nordin et al., 2010). Researchers present non-traditional means to accomplishing this, such as mentoring, observation, and ongoing activity-based meetings (Barrett-Greenly, 2013; Bayar, 2014; Kazempour & Amirshokohi, 2008; Zhao, 2013). Dewey (2008) and Morrow (2009) both mention reflective practices, community building, and conversation. The nature of these strategies is espoused with human-life and are considered self-educative, which defines the foundation of the democratic approach (Morrow, 2009). Jackson et al. (2013) supported this position stating,

The stringent hierarchical format of professional development is shifting to a more democratic forum where ideas, concerns, and alternatives can be discussed openly while still maintaining the goal of expanding one’s repertoire for the sake of improving education. Democratic forums of professional development hold promise for the use of mobile learning

applications with adult learners in the role of instructor in higher education (p. 110).

It must be noted at this juncture that this research is not intended to provide a list of “to-dos” during an innovation, nor to serve as a suggestion box from which no real guidance is derived. Rather, it is intended to shift the view of innovation toward an ongoing process that is intrinsically driven, supported by community in the spirit of growth and executed in democratic fashions (Harwell, 2003).

### **Democratic Tactics Implementing Mobile Devices**

#### **Bottom Up Innovation**

*“Giving and taking of orders modifies action and results, but does not of itself effect a sharing of purposes, a communication of interests” (Dewey, 2008, p. 10).*

An implication of ongoing support for successful mobile technology implementation in school settings is common in the literature. For the purposes of this research, *bottom up innovation* refers to the educators’ role in deciding which pieces of technologies enter their classrooms. The three sub-headings in this section are the most commonly referenced as democratic innovation tactics in the literature that remained after the deductive process for inclusion (Bernard & Ryan, 2010; Moustakas, 1994; Opler, 1945). The subheadings includes ownership, context, and learner-centered approaches to technology implementation in classroom settings.

I focused on the literature that reference intrinsically driven motivation as the key to authentic learning and self-growth (Dewey, 2008; Dooley, 1999; Drouin et

al., 2014; Herrington et al., 2014). Essentially, intrinsic meaning are integrated and actions are taken. Herrington et al. (2014) assert that tablets must have real world relevance which is subject to individual perspectives; whereas Ouzts and Palombo (2004) argue that motivation to explore technology must be considered in the equation. Relevance, perspective, and motivation are determined as intrinsically driven, not externally enforced, and touch upon unique bottom up approaches of tablet use that are focal points of this review.

Traditionally, knowledge has been a system of proficiency imposed upon students by specialists, what Gee (2000) refers to as *old capitalism* (p. 107). A fundamental problem with old capitalism regarding tablet implementation in academia is streamlining strategies to one-size-fits-all (Dahlstrom, Walker, & Dziuban, 2013; Dewey, 2008). Similarly to student populations, educators are extremely diverse, and their needs differ at different times. Dohn (2009) find from their research of three Australian university faculties that “bottom up participation and interactive multi-way communication, continuous production, reproduction, and transformation of material in use and reuse across contexts” are the most valued aspects from their experiences with 2.0 technology integration (p. 345).

Further, it is important that it addresses changes that each individual goes through during different stages of the bottom up process (Bennet et al., 2012).

Unfortunately, top-down innovation is hierarchical in nature and marginalizes diversity, which ignores the vacillating emotional reactions as evidenced in the abundant literature on teacher resistance to change (Hall et al., 1991; Khalil, 2013).

Innovation is a personal endeavor, and for a culture of innovation to develop, viewing innovation as a process, not an event, is essential in developing a new capitalism (Gee & Hayes, 2011; Harwell, 2003).

**Problems with top-down innovation.** Choice during an implementation process is a key factor; it begins with an appreciation of how differently people situate themselves when taking on new, unfamiliar, and challenging tasks (Sharples et al., 2007). Albert Einstein (1879-1955) once said, “The problems we have today cannot be solved with the same thinking we had when we created them (Hayek, 1945, p. 525).” For many educators, mobile technologies are considered radical tools, and the mobile aspect itself threatens commonly accepted and effective educational norms in terms of static dynamics of the past (Hall et al., 1991). Fundamental issues with innovation include oversights of individual experiences and choice, which is due to pressures to standardize innovation procedures for accountability purposes (Hall et al., 1991; Khalil, 2013; Yelland, 2009). Hannafin, Dalton, and Hooper (1987) find that rather than promoting diffusion and adoption educators will stonewall change due to personal, territorial, and political threats that innovation poses. Although this may have seemed optimal for education leaders who aspired to overhaul schools in a timely fashion to increase technology usage in accordance with state or federal mandates, such as No Child Left Behind (NCLB) (Act, N.C.L.B. 2001), top-down innovation undermines effective strategies for authentic learning (Kazempour & Amirshokoohi, 2008; Koole, 2009; Ouzts & Palombo, 2004).

The verbiage used in the U.S. Department of Education NCLB mission statement, *Enhancing Education Through Technology* (Act, N.C.L.B. 2001), reflects hierarchal demands: “Goal: Integration of technology resources and systems with teacher training and curriculum development using research-based methods that can be widely implemented as best practices by State and local educational agencies” (Part D, Sec. 2402b). Best practices, by nature, lack what Greene (2011) has termed as the “selection on the dependent variable” (p. 72). Put simply, if organizations with only positive outcomes are considered, there is no variation on the dependent variable, indicating reduced reliability of previously identified success elements. Schoen and Fusarelli (2008) exemplify this system, highlighting NCLB’s priority of standardized content knowledge versus the 21<sup>st</sup> Century Schools Movement priority of individualized learning and skill development (p. 188). The key difference is the autonomy provided to educators in determining and developing systems, using technologies that are contextually relevant to their students and their instruction.

In 2002 under the NCLB mandate, West Point endured a failed rollout program (Efaw, 2005). Due to their high turnover, the single required course to introduce a mobile device did not reach new instructors and did not address many faculties’ concerns, prior level of use, or application in a practical setting. Baran (2014) suggested that although best practices uncover some critical findings, more appropriate practices regarding the digital era are methodologies, such as project or design-based research. These in conjunction with ethnography help to better

understand how technology interacts within social and cultural constructs in teacher education dynamics (Baran, 2014, p. 30).

Conlon's (2004) study of the £230 million United Kingdom Government's New Opportunities Fund (NOF) program for information and communications technology integration report a major failure due to the hierarchal fashion in which the implementation was mandated. He lists four elements that contributed to this demise:

1) assumptions that "good practice" is formulated from outside sources to be actualized by inside actors; 2) dismissal of educators' understanding of development and epistemology; 3) omission of the complexity of development processes educators face, particularly with new technologies; and 4) failure to recognize the complexities of curriculum for some students, particularly when educators must referee between reform and differentiate their instruction to optimize student learning (Conlon, 2004).

Arguments against hierarchal systems of innovation have begun with a consideration that educators build on their understanding of tablet capabilities. Through exploration and discovery, their belief systems become more prevalent, qualifying what they have experienced as being pedagogically sound or not (Kopcha, 2010). Exploration, executed in individual fashions over time and based on personal interests and needs, becomes the foundation for developing a sense of ownership, not only of the device, but also of one's own theory of mobile learning (Nordin et al., 2010; Sharples et al., 2007). Contextually appropriate applications in

the classroom begin to take presence once there is a relationship established between device and user (Kazempour & Amirshokohi, 2008).

**Ownership.** Geist (2011) states that the topic of technology in academia begins with individuals' belief systems. It is imperative that educators truly believe the implementation of tablets into the curriculum will benefit themselves and their students. In accordance with Opler's (1945) third element of theme development, an omission of this belief in technology affordances result in a superficial implementation that will not be sustained over time. Hogue (2012) presents a means for testing this omission by recommending that devices be provided to educators involved in a systematic implementation and then their responses to the device being withdrawn be evaluated. She reports that the loss of the device commonly has a negative impact on workflow once they have established usage during the time of the innovation process, thus, substantiating the assertion that educators organically assume devices in ways they may or may not be completely aware of initially (Hogue, 2012). Such an evolution is evidence of an intrinsically driven phenomenon in response to an external stimulus. Although tablet usage may increase with exposure, the PEW Research Center (2013) reports that tablet ownership has increased 31% since 2010; however, only 34% of adults currently own a tablet. This implies that adults acquire tablet usage reluctantly; when accountability is at the forefront of education discourse, educators are hesitant to innovate, particularly if deemed inappropriate to their teaching practices, subject matter, or student populations (Khalil, 2013).

***Ownership through personalization.*** As research suggests, educators who maintain a sense of ownership are more apt to integrating the device into their personal and professional lives if they personalized their innovation experiences and devices. Bennett et al. (2012) refer to this as *collective ownership*, meaning that although learners may have the same type of device, their individualization of the device provide a sense of ownership that is necessary for authentic adoption (p. 345). Cochrane (2010) and Jones, Issroff, Scanlon, Clough, McAndrew, and Blake (2006) extend the concept of ownership to the software that has been chosen, as well as the design of the device itself, including app arrangement, protective covers, screen savers, and so forth. Eichenlaub et al. (2011) have researched a small sample of college students whose top complaint about the institution-issued iPads they were provided for one year is their inability to personalize the device since allotted funds to purchase additional hardware and software were limited.

In Kearney and Maher's (2013) small-scale study with pre-service teachers, they created a framework for m-learning environments with a key component being personalization. Their position stemmed from their belief that if an educator was given the opportunity to personalize their mobile devices, then they might enjoy a "high degree of agency in appropriately designed m-learning experiences together with the ability to customize and tailor both tools and activities, leading to a strong sense of ownership" (p. 78). Their rationales of the importance of ownership are substantiated by the diverse products created by participants, reportedly facilitated by an ability to execute tasks in ways that appealed to them individually. Further,

the assorted outcomes demonstrate a development of pedagogical skill that is mediated by mobile technology (Kearney & Maher, 2013).

Elements of ownership are akin to learner-centered approaches in teaching in that the direction learning depends on a series of learner experiences (Jones et al., 2006). With mobile technology, simply setting up a device optimizes its functionality, which leads to considering a wider repertoire of usages and a sense of ownership. As one participant from Barrett-Greenly's (2013) iPad project stated, "the iPad is a more 'personal' device, due to its mobility and the ability to customize it" (p. 92). To put plainly, one must personalize the device before they can professionalize a tool that has the potential to play a pivotal role in professional success (Herrington et al., 2014; Jones et al., 2006).

***Ownership was motivating.*** Jones and colleagues (2006) conducted a meta-analysis of informal mobile-learning projects and deduced six elements that were highly motivating to tablet explorers: Freedom, ownership, communication, fun, context, and continuity (p. 252). Freedom to learn about topics of personal interest heightened intrinsic motivation to explore the tablets. Control over a learning tool provided a sense of ownership of learning. Communication and collaboration in informal settings prompted sharing and learning in more formal contexts because of the confidence derived from acclimating to the device (Sharples et al., 2007). The entertainment value of certain activities performed on a tablet motivated users to continue usage. The context in which information was sought was never static; therefore, it proved resourceful in anytime-anywhere scenarios of learning. The

ability of a device to provide continuity between contexts highlighted the mobility aspect of the tablet for learning purposes (Jones et al., 2006). Eales, Hall and Bannon (2002) refer to this fluidity of the device as *de-schooling*, meaning that learning is no longer subject to formal settings, conducted by a figurehead in a single location, but rather by a robust dynamic between learner, device, and anytime-anywhere information.

Montrieux, Courtois, DeGrove, Raes, Schellens, and DeMarez's (2014) international studies on tablet integration find that curiosity, motivation, and interest remain high until approximately six months when the newness wears off and the sense of ownership wanes. Dooley's (1999) qualitative investigation of holistic methods of technology integration finds that interest in devices typically diminished after one year if it created too much change and required too much time. In response to this dilemma, Bayar's (2014) research suggest giving choice to educators, so their individual needs are met through active participation in the design of the innovation to elicit a sense of shared ownership over the learning process and motivation to persist. One teacher stated, "I wish I could have more opportunities to participate in the process of planning of professional development activities [b]ecause I personally believe it could motivate me more" (Bayar, 2014, p. 323).

Klein and Sorra (1996) investigate organizational implementation processes and find that stakeholders have an emotional reaction to new technology that either support or diminish their motivation to use the technology. Further, the more

complex the technology was, the stronger their negative reaction was to it (Aiman-Smith & Green, 2002). With tablet technology only six years old, many have not yet acclimated and find the tablet interface more complex than others. Skepticism of mobile technology inevitably affects an educator's willingness to implement it into his or her teaching practices, as its functions cannot yet be contextualized. Klein and Sorra (1996) recommend employing a user-centered approach when evaluating technology, taking heed of the user's emotional responses, including motivation over time. Montrieux and colleagues (2014) concur with regard to the importance of taking inventory of educators' emotional status at different junctures of the process of integrating tablets since they are continuously shifting.

In contemporary literature, there are assertions that personalization of mobile technologies helps combat educators' impressions of hierarchal demands to innovate, sustaining interest in tablet affordances for their particular situations. Researchers designed studies that investigated pedagogical uses of tablets but inadvertently found affective elements that impacted sustainability (Kukulska-Hulme, 2012). From a democratic perspective and accounting for the emotional implications of innovation, educators gained better insight into how and why they chose to integrate technology or not (Klein & Sorra, 1996; Morrow, 2009). The difference between emotional implications and resistance may have appeared to be trivial, but the clarifying characteristic is the fundamental issue of choice over mandate to innovate, and the subsequent steps educators take when they have a sense of ownership over the process.

**Context.** Context accounts for both internal and external factors that influenced educators' decisions. According to Schwandt (2007), epistemology and speculation of theories elicit intrigue about innovation proposals. Schwandt (2007) describes this process as the "context of discovery, [in which] the imagination, intellectual interest, values, dispositions, and theoretical inclinations of individuals, as well as institutional commitments and values influencing [their] choices, are all relevant matters" (p. 42). This hermeneutic contextualism of mobile devices in education is, thus, contingent on the interpretations of the device in context and the capacity in which they were utilized within the culture of the institution (Schwandt, 2007, p. 43).

***What does "mobile" mean?*** The ways in which tablets are "mobile" are threefold: time, space, and context (Naismith, Lonsdale, Vavoula, & Sharples, 2006). Naismith et al. (2006) note that mobile learning takes place at any time, in any space, and for a myriad of purposes. Nyiri (2002) further asserts that "knowledge is information in context" and attributes the nature of mobile devices to support anytime-anywhere learning, which are well placed in the education realm (Naismith et al, 2006; Sharples et al., 2007).

MyArtSpace was a one-year project conducted in the UK that utilized tablets by students and educators on museum field trips, setup to provide internet service for resourcing such as chat rooms for communication, and memos to record thoughts or interpretation of art pieces (Guisasola, Morentin, & Zuza, 2005).

Findings suggested positive experiences due to personal motivation as participants

delved deeper into the art itself (Guisasola et al., 2005). The transferability of learning from the museum context to the classroom context contributed to extended learning (Chan, Roschelle, and Hsi, 2006). Further, three facets of mobility applied directly to this educational scenario. Recommendations included a more controlled environment to pinpoint external influences of behaviors using the tablets, implying the consequence of environmental contexts on technology use.

*Contextual uses of mobile devices.* Implications from studies referred to context as a crucial element to consider when planning innovation in higher education settings. For example, Moody and Kindel (2003) found that instructors who taught more qualitative subject matter used mobile devices for communication and word processing purposes; while the instructors who taught more quantitative subject matter utilized spreadsheets and quantitative applications (p. 46). Their recommendation included knowing your faculty and obtaining input on how technology might help achieve desired outcomes in order to remain a viable resource (Moody and Kindel, 2003).

Bayar (2014) found that the top three aspects of the activities educators participated in that elicited positive reports were ones that matched teacher needs, complimented school needs, and involved the teachers in the design of the activities throughout the process (Bayar, 2014). Barrett-Greenly's (2013) findings agreed with Bayar (2014), particularly in regard to teachers choosing applications that assisted them in gaining a sense of direction for particular lessons. The affordances provided by the software, when matched with the individual's pedagogy, bolstered

the lessons they taught and further solidified a sense of what mobile learning looked like within curriculum context (Barrett-Greenly, 2013).

Carlson and Gaudio (2002) explored the topic of context in numerous innovation dynamics and determined that when technology implementation was the topic of discussion that there were five areas that needed to be addressed. The first was initial preparation; review of the basics of successful classrooms, such as classroom management strategies, organization, mastery of the subject matter, and the use of outside resources, including technology. The second area was ongoing development that provided opportunities to improve on previous practices while experimenting with new ones that directly connected to student learning. The third area was hands-on use of technology to build upon individuals' competencies. The fourth area was determining curriculum-specific applications, so educators could establish a link between technology and the mandated curriculum. The fifth area was discussing the new roles educators played in the facilitation of gaining knowledge in the 21<sup>st</sup> century, for no longer was learning unidirectional, but rather, it is an unique synergy of students, teacher, and the technologies used to accomplish learning objectives (Carlson & Gaudio, 2002; Smith & Kukulska-Hulme, 2012).

Carlson and Gaudio's (2002) holistic vision of innovation dynamics is consistent with research supporting learner-centered approaches and reiterate the importance of individual perspectives on the pedagogical soundness of mobile technology in the classroom. Further, they insist that mobile technology in the classroom, itself, do not replace the role of educators; rather, "it requires the teacher

to project more forcefully into the students learning, evaluate internet information, develop information-reasoning skills, and requires a deeper understanding of their subject matter” (Carlson & Gaudio, 2002, p. 129). Robinson (2011) concurs with this aspect; a device does not replace the valuable insight provided by educator experience.

***Consider context before implementing mobile technology.*** Combinations of significant elements of learning cannot be generalized; therefore, the issue of context in institutional innovation must be reviewed on an individual basis. Evaluations of mobile technology’s effectiveness are more relevant and reliable when educators and education leaders consider the layers of influence on the context. Smith and Kukulska-Hulme (2012) coined the term *ecology of mobile learning* that pointed out the multiple environments in which devices shape pedagogy, as well as activities in the personal lives of educators. Koole (2009) deduced the multiple layers into three categories: the device, the learner, and the social aspects in which they reside (p. 27). The degree to which each of these three areas affected learning determined if technology was beneficial in that context or not. Kazempour and Amirshokohi (2008) found in their study of science educators that without contextualizing innovation or the affordances of the device that bridge the real world to the classroom learners ultimately lost interest.

Dooley (1999) assert, “For schools to improve, teachers must change. For teachers to change, there must be appropriate and promising practices and procedures (innovations) that they develop or adopt and, when necessary, adapt”

(p. 1; Hall & Hord, 1987). Herrington et al. (2014) connect these practices and procedures to authentic contexts that resemble learning in real life. When the use of mobile devices in the classroom looks like what students do and see in the real world, the viability of instruction and of the educators' teaching practices affect student outcomes in positive ways. For example, from Open University's Building Mobile Learning Capacity Initiative (2010-2012), teaching practices changed primarily due to the success educators witnessed of their students who reported their uses of the tablets were compatible with their personal uses (Smith & Kukulska-Hulme, 2012). In addition, educators' blogs during the 18-month study mentioned how the democratic design of the project allowed them to explore, learn, and develop competencies that enabled them to use tablets in different or new ways (Smith & Kukulska-Hulme, 2012).

Up to this point context is interpreted as the unique arrangements of the environment, people, technology, and subject matter (Bayar, 2014; Carlson & Gaudio, 2002; Guisasola et al., 2005; Koole, 2009; Moody & Kindel, 2003; Naismith et al., 2006; Smith & Kukulska-Hulme, 2012). Although this lens is critical for understanding that innovation processes vary from person to person and from subject to subject, context is the *process* of knowledge changing from tacit to explicit, manifested by the individual as a unique learner. This segues to the next democratic tactic for innovating in educational settings, learner-centered.

**Learner-centered.** Traditional models with emphasis on content knowledge, quantity, and end products lose ground to more learner-centered

methodologies of instruction that have viewed learning as a process (Burns, 2013). The literature on learner-centered approaches in education was replete with respect to students as the subjects but minimal with respect to educators as the subjects and definitions varied. Bayar (2014) discusses active participation. Dawson (2007) focuses on inquiry into topics of personal interest. Drouin et al. (2014) highlight the importance of choice, while numerous researchers investigate motivation as an integral part of learner-centered approaches (Jones et al., 2006; Koole, 2009; Lee, 2005; Liu, Salomaa, Huang, & Ma, 2008). Reasonably, each one of these elements plays a role in the synthesis of an individual as a technology user, but what has surfaced in the literature, through the democratic lens, is a specific focus on learner-centered opportunities to innovate. In nearly half of the reviewed articles, learner-centered approaches are reported directly as effective for the actualization of technology in the classroom.

Using Sharples et al.'s (2007) definition, learner-centered activities build on the skills and knowledge of the individual learner, enabling them to reason and create meaning from their own experiences (p. 3). This view considers the intricate facets of an individual that compose a *learner* and the semiotics behind their technological practices (Sharples et al., 2007).

***Learning with and around technology.*** Kukulska-Hulme (2012) proposes the “need [of educators] to learn *with* technology, not *about* technology” (p. 248). This highlights, very simply, the shift in how learning occurs with mobile technology. According to the US National Research Council (1999), the design of an

innovation should focus on the learner and his or her learning style and capability. Lefoe et al.'s (2009) study with Australian Education Faculty allowed them to peruse the iPad for a 6-month period of time before implementation that exemplifies how an organization might allow educators gradually to develop a repertoire of uses, so their knowledge and understanding remain authentic yet progressive. Schrage (2013) recommends that institutions desiring innovation must first prototype their ideas (p. 30). By doing so, they make investments in program quality, "human capital, and innovation capacity" (p. 36).

Jackson et al. (2013) conducted a one-year iPad study, noting faculty requests of 50 apps that ranged from Garage Band, a digital music creation studio, to DSM V, a digital version of the Diagnostic and Statistical Manual of Mental Disorders (2013), demonstrating a range of interests and apps that fit varying teaching styles. Lefoe et al. (2009) used an Action Theory method for the first six months that provided time for participants to explore iPods and Palm Treos in reflexive and collaborative exercises. Using what teachers had learned in their preparation term, they were equipped better to develop and implement contextually relevant applications with students. Ultimately, what surfaced from these studies was an understanding that mobile learning referred to the *user*, not the device; therefore, it catered to both educators and students in anytime and anywhere contexts (Lefoe et al., 2009). Another important finding was *how* educators learned *with* technology rather than *what* they learned *about* technology that supported learner-centered explorations.

***Test-driving mobile technologies.*** The literature examines the importance of education leaders to consider test-driving or prototyping technology prior to institution-wide implementation, as some faculty find innovation counter-intuitive to their teaching practices (Schrage, 2013). Geist's (2011) research with pre-service teachers implicated that the exploration with the iPad initially seemed inappropriate for younger students, but once seen in action, the educators were motivated to incorporate it into their future teaching. This is what Eichenlaub et al. (2011) mean when they state, "the real potential of the iPad is its ability to democratize the learning process" (p. 19). The experiments with and assessments of proposed changes to teaching practices allow educators determine relevance by attributing a sense of co-authorship, contextualization, and foundational individual goals. Lefoe et al. (2009) cosign this notion when they delineate the significance of educators being given devices to explore at a gradual pace in both their personal and professional lives to familiarize him or herself to a degree that they become comfortable using the devices in their curriculum.

Schmidt and Ho (2013) administered iPad minis to pre-service teachers and instructors to use freely for one year. Concerns over the ever-changing technology, cheating, over-reliance on technology, and the overabundance of apps for certain teaching objectives makes apps difficult to select (Schmidt & Ho, 2013). The researchers suggest providing sufficient time to explore the device and applications so educators are more confident in deciding how to implement technology, which supports teaching objectives. Also, Barrett-Greenly (2013) reveals that a

considerable amount of time is necessary to adapt new tools. Further, the exercise of practicing using the iMovie app, both in class and at home, allowed the educators to learn by creating content that interested them (Barrett-Greenly, 2013, p. 93).

Vazquez-Cano (2014) used a similar design that examined the use of mobile devices by 388 university students and discovered that the narrative aspect of learning a device and its applications provided learners the opportunity to explore personally significant issues. Lefoe et al. (2009) found that exploring the iPad six months prior integrating it into their teaching, “support[ed] the need for staff to own and use mobile technology in their professional and personal contexts in order to think differently about engaging their students in pedagogically sound ways” (p. 16).

Michael Schrage (2013), author and research fellow at the Center for Digital Business at MIT, asserts the importance of *play* in the process of innovation. The word play is synonymous to exploration and reflects the deepening of understanding and fluidity through trial and error in informal fashions. It is the player’s degree of curiosity and rigor that determines the outcome of play, and therefore, manipulating a device and the ideas and representations of what the device offers invigorates educators’ practices (Schrage, 2013). Schrage (2013) states, “Serious play is not an oxymoron; it is the essence of innovation” (p. 15).

***Mobile technology is an evolution of learning.*** Zhao, Pugh, Wong, Sheldon, and Byers (2002) examine the conditions in which effective innovations has taken place in classrooms. They note that even those who are relatively tech savvy still struggle with changing their teaching practices if the device is distant from their

teaching paradigm and/or existing school culture. When examining research projects integrating tablets into curriculum, one main theme emerges: innovation tends to be seen as a revolution in education rather than an evolution (Zhao et al., 2002). The role of the learner/user is short-changed by viewing tablets as the device that will change pedagogy. Recalling the concept Dewey (1904, 1933, 2008) has set forth, growth is not a static phenomenon; it is dynamic and contingent upon the ecologies that surround each individual. It is theorized that a paradigmatic shift is occurring, and the focus placed on human agency is emerging.

It appears that learner-centered approaches lack structure, and the research provided thus far only leads to more questions about how to innovate when there is a real pressure to meet the demands of globalization. This is addressed by referring back to seminal research. How one learns, changes, and becomes part of a culture is through curiosity, determination, and reinforcement within the ecologies of technology usage. These are attributed to human agency not to technology itself (Bennet et al. 2012; Cochrane, 2010; Crook, 1996, 2000; Eichenlaub et al., 2011; Kukulska-Hulme, 2012; Lefoe et al., 2009; Sharples et al., 2007). Referring back to Zhao et al.'s (2002) assertion, innovation needs to be a proactive evolution of the educator not a reactive revolution to employ digital devices in classrooms.

### **Critique of Literature on Bottom Up Democratic Tactics Implementing Mobile Devices**

My review of literature focused on bottom up innovation and had several commonalities and limitations. Studies primarily used small samples, between 11

and 20 participants. Some had as few as 3, while only one study had over 3,000 participants. This limitation made their findings non-generalizable, and thus, prompted recommendations for larger samples.

The majority of studies were conducted in short time frames of less than one year. Due to the common setting of education institutions, many researchers were limited to single semester time frames to explore devices. This prompted the recommendation of conducting longitudinal studies, so longer term implications could provide more data about the pedagogical impact of mobile device usage. Also, Price, Davies, Farr, Jewitt, Roussos, and Sin (2014) noticed this limitation, asserting the need for more longitudinal studies that observe mobile device implementations into classrooms and pedagogical approaches educators take within the classrooms they teach. Evidence of the transference of knowledge could, therefore, add rigor to phenomenological research.

Mixed methods approaches, combination of observations, surveys, focus groups, case studies, reflections/blogs, and interviews, were dominant in these research studies. Referring back to Baran's (2014) suggestion of research designs that include ethnographic data to better understand the culture in which innovation is taking place, mixed methods are instrumental in providing evidence of the effects of ownership, context, and learner-centered innovation processes both quantitatively and qualitatively.

Various theoretical frameworks and tools that guided innovation processes were discussed in the research, but social-constructivist ideals were laced

throughout the research designs and findings. This made sense given the nature of innovation to be a step-by-step development of understanding and fluidity based on experience and building on previous constructs. Also, the social aspect was understandable within the innovation context because the guidance and provision of tools needed to address personal and professional goals. These ethnomethodologies allowed participants to share an intersubjective understanding of why, how, and where to use mobile devices for pedagogical purposes.

In critiquing the overall body of literature, there were two notable aspects. First, I believe much of the research done in the area of tablet technology's effect on educators as learners, and the steps taken to provide evidence of pedagogical soundness, lacks any resolutions of developing a theory specific to mobile device epistemology. Rather the social-constructivist perspective has been regurgitated, reflecting previously established theories of learning. As mentioned above, social-constructivism is a logical lens; if social science is to advance and to create a paradigm shift, a new theory is warranted that addresses the difference between learning and learning mediated by mobile devices. As research aggregates and as the populace of the digitally literate grows, a theory will surface that is replicable in future research endeavors. Also, Baran (2014) argues for research that leads to new theories. He states that, "while these best practices reveal critical findings, future empirical research must follow other methodological routes such as design-based research to develop theories within practice and ethnography to understand how

mobile learning interacts with social and cultural dynamics in teacher education contexts” (p. 29-30).

The second notable aspect of the research is the lack of individual, ethnographic accounts of the innovation process (Crook, 2000; Baran, 2014; Barrett-Greenly, 2013; Bennett et al., 2012; Carlson & Gaudio, 2002; Dooley, 1999; Drouin et al., 2014; Efaw, 2005; Geist, 2011; Kukulska-Hulme, 2012; Sharples et al., 2007; Zhao, 2013). Although the concepts of ownership, context, and learner-centered practices touch upon the individual and the need to consider human conditions and dispositions, no synthesis of individuals’ personal characteristics has been noted as impactful on the adoption of digital devices for instruction (Brown, 2005; Koole, 2009; Kopcha, 2010). For example, many of the methodologies include blogging and other reflexive activities that required discourse analysis, but a synthesis of characteristics such as individual time lines of particular digital uses in conjunction with specific support systems have been reported (Efaw, 2005; Eichenlaub et al., 2011; Geist, 2011; Herrington et al. 2014; Kazempour & Amirshokoohi, 2008; Kukukska-Hulme, 2012; Lefoe et al., 2009). Common suggestions include presenting mobile devices and software that are paired with particular teaching objectives within the context of an institution’s mission or position on pedagogy.

## Ongoing Support

*One of the weightiest problems with which the philosophy of education has to cope is the method of keeping a proper balance between the informal and the formal, the incidental and the intentional, modes of education. When the acquiring of information and of technical intellectual skill do not influence the formation of a social disposition, ordinary vital experience fails to gain in meaning, while schooling, in so far, creates only "sharps" in learning – that is, egoistic specialists. – John Dewey (2008, p. 13)*

The majority of researchers' articles included in this review have reported implications of ongoing support for successful mobile technology implementation in school settings (Afshari et al., 2009; Becker & Riel, 2000; Bennett et al., 2012; Carlson & Gaudio, 2002; Cochrane, 2010; Cradler & Cradler, 1995; Crook, 2000; Dawson, 2007; Dexter, Anderson, & Becker, 1999; Dooley, 1999; Drouin et al., 2014; Efaw, 2005; Friel, Britten, Compton, Peak, Schoch & VanTyle, 2009; Herrington et al., 2014; Hineman, Morris, Boury, & Semich, 2015; Hogue, 2012; Kopcha, 2010; Kukulska-Hulme, 2012; Lefoe et al., 2009; Nordin et al., 2010; Naismith & Corlett, 2006; Pellegrino, 2007; Scagnoli & Hong, 2012; Sharples et al., 2007; Zhao et al., 2002). This section blends the elements of ongoing support because they are woven together intrinsically; unlike the previous section on bottom up innovation dynamics where ownership, context, and learner-centered tactics warrant separate rationalizations. Collaboration, community, and mentoring to model and mitigate barriers are a symbiosis of social characteristics that will be addressed in this section as a whole.

For innovation to be considered, an idea must be presented, and a body of educators must gather on a number of occasions. For educators to accept and

acquire a new skill into their instruction they must share information with another person experiencing or who has experienced the same changes and challenges (Crook, 2002). Jones et al. (2006) argue that collaboration itself is a motivating factor in gaining traction during an innovation process, and Crook (2000) maintains that the nature of collaboration serves as interpersonal support, which “affects the character and rhythm of conversation” (p. 100).

**Communities and idea leaders.** Once educators collaborate with one another on a regular basis, dialectic conversations develop discourse, and a community is cultivated (Dewey, 2008; Sharples et al., 2007; Sharples et al., 2009; Wenger, 2000). Community, according to Sharples et al. (2007), is comprised of multiple people or sub-groups who share a common objective and who develop a cohort that is distinct from all others. Individuals who pioneer changes are enthusiastic, knowledgeable, and available throughout the change process and rise up from these communities. Burns’ (2013) “techno-enthusiasts” or Hogue’s (2012) “idea leaders” become mentors to those acquiring new knowledge and/or new understandings of the innovation (p. 38). The key purpose is to model uses and to mitigate barriers, so those still exploring aspects of the innovation can focus on learning rather than exhaust energies circumnavigating technical and pedagogical obstructions (Cochrane, 2010; Drouin et al., 2014; Efav, 2005; Hogue, 2012; Lefoe et al., 2009).

**Dynamics of ongoing support.** Ongoing support implies a departure from episodic professional development sessions or innovation and training initiatives

that have not sufficiently prepared educators to teach confidently with technology; thus, argument for something new emerges (Naismith et al., 2006; Sharples et al., 2007). Bayar's (2014) qualitative research on teacher perspectives of professional trainings indicate that traditional programs do not provide the depth of knowledge needed for educators to adopt changes in their instruction. Long-term support from administration and peers is repeatedly suggested to acquire the skills to teach using new tools. Dexter et al. (1999) believe that constructivist methods for educational technology integration required a supportive climate in which to explore and voice concerns.

Support goes beyond technical guidance, such as sufficient bandwidth or functioning hardware. Support includes an investment from school administrators who have a strong understanding of pedagogy, so the implementation of technology adheres to current paradigms. Also, it includes having possession of all of the materials necessary for effective classroom activities and time to explore, learn, refine, and practice using technology prior to implementation (Crook, 2002). Finally, according to Burns (2013), it includes the "support from a knowledgeable and caring follow-up person, head teacher, coach, or mentor. This is often the most expensive portion of school-based technology investments, but without this, the returns on investment in educational technology are negligible" (p. 42).

**In house support systems.** Research indicates that peers within the same institution are best suited to gain *depth* of a subject matter, whereas educators from other institutions were suited best to provide *breadth* to a subject matter. In this

way, mentors are suited best to promote breadth of involvement during innovation processes (Becker & Riel, 2000; Drouin et al., 2014; Hogue, 2012). Bennett et al. (2012) and Koole (2009) also make this connection, suggesting that this type of ongoing support provides a broader view of changes occurring by presenting a myriad of interpretations, pedagogical applications, and technical advice over time as needs, technologies, and cultures evolve. Dawson (2007) describes this as “providing a light bulb for conceptual change,” (p. 10) and Drouin et al. (2014) emphasizes the power of inspiration on change.

Carlson and Gaudio’s (2002) position on professional development with technology stem from data they have collected from educators who made recommendations on how to optimize their own learning experiences. They state that ongoing support should include multifaceted and collaborative efforts that are continuously evaluated and properly funded (Carlson & Gaudio, 2002). To adhere to these suggestions, maintaining an on-site or in-house dynamic are essential. Communities that form within the same institution undergoing change with technology have to agree that the change is beneficial to educator’s teaching, student learning, and the proper steps to take as a team before venturing out independently (Barrett-Greenly, 2013; Cradler & Cradler, 1995; Efaw, 2005).

Burns (2013) believes the most important preliminary step is to have a shared vision of innovation, projecting what pedagogy would look like with technology, but this area was most commonly overlooked. This deficiency predictably results in technology implementations that meander or fail. He

emphasizes that a vision created by all actors involved, offers coherence and provides a framework that guides all aspects of the innovation. Also, he believes that a shared vision fosters collaboration and strengthens commitment among all stakeholders (Burns, 2013). Dewey's (1904, 1938) fundamental precept of accountability in education is based on the collaborative efforts of a group sharing similar experiences, so a sense of responsibility to each other as well as the institution of education is distributed equally. Gee and Hayes (2011) believe that this "wisdom of a crowd" proliferates through ongoing daily interactions, could seed insights beyond the experts (p. 73).

Inspired by the Community of Practice inquiry design, Schuck, Aubussen, Kearney, and Burden (2013) collected data from a group of university educators who formed a professional learning community (PLC) to explore teaching practices using mobile devices (Wenger, White, & Smith, 2009). It included conversations, blogs, podcasts, and tweets that were shared amongst members of the PLC. They reported that the community dimension provided "critical friendships" with peers who were acquainted with the experiences of their partners and able to respond with technical and pedagogical support. Their recommendations were to immerse members in the use of technology, to assist in familiarizing and critiquing their uses, to provide authentic learning experiences, to "explore nuanced pedagogical variations in their technology-mediated teaching approaches", to encourage risk-taking, to make sufficient time to collaborate, to create partnerships among faculty

members, and to participate in scholarly activities, such as publishing and presentations (Schuck et al., 2013).

**Initiating change by a collective agreement to innovate.** The initiation of a collaborative effort can ensue from an institutional plan to modernize classrooms and provide state-of-the-art instruction or from an intrinsic drive to diversify one's teaching practices to meet the need of millennial students (Harris & Hoffer, 2009; Scagnoli & Hong, 2012). In both cases, collaboration begins with educators who are motivated to learn and who are not afraid to take risks. Lefoe et al. (2009) capture this endeavor, stating, "Changing teaching practices through engagement with new technologies is often carried out by enthusiasts, individuals working on their own projects influenced by the latest trends in technologies. Often this 'lone-ranger' may allow the technology to drive the changes in teaching practices instead of allowing pedagogy to drive the changes required to improve learning outcomes" (p. 16).

Several universities underwent tablet technology innovation from the bottom up by forming communities that support changes to teaching practices. Pepperdine University launched a three-semester iPad pilot study, spearheaded by a few in-house tech savvy education leaders, placing iPads in the hands of participating instructors and students (Hoover & Valencia, 2011). The collective interest, successes, and failures of the device and software usage were categorized and rated in a collaborative fashion that assisted faculty and students in determining best practices within context. They reported that collaboration of the pilot study research team, or mentors, mitigated potential barriers for educators by

guiding participants through their options while still maintaining the integrity of their paradigms.

Jackson et al. (2013) employed a collaborative design with the monthly gatherings they arranged for sharing ideas, practices, and pitfalls (Jackson et al., 2013). These discussions mitigated barriers by demonstrating applications on the iPad that served or did not serve various purposes. The faculty collectively discussed affordances of iPads and apps, such as classroom management, sharing resources, creating content, and student collaboration. One participant stated, “What was the most beneficial to me was being part of a team, keeping me accountable for learning the apps. I can’t just sit and do nothing. I have to be able to share with others” (COPE study Transcripts, Nov. 22, 2013). From Dahlstrom’s et al. (2013) large-scale quantitative study, they correlated educators’ collaborative relationship to students seeking guidance from on-site teachers for technical assistance who were familiar with the institution and part of the same culture. One professor and faculty senate president from Nagel’s (2010) study stated, “the objective of the faculty pilot program will be to develop examples of using iPad technology to enhance and expand traditional legal education without diminishing any of the core academic values” (p. 1). His statement referenced collaboration between faculty members to improve practices while having a common culture that connected them and guided them through the process.

The Massachusetts Institute of Technology’s (MIT) physics department faced high failure rates of 15% in two core classes (Breslow, 2010). In response to this

issue, two departments decided they would go digital to see if the problem could be fixed; thus, the Technology Enabled Active Learning (TEAL) project ensued (Breslow, 2010). According to Breslow (2010), this project was a textbook case for innovation because it had all the components necessary for success: sufficient funding, a faculty advocate, and departmental and institutional support (p. 24). This collaborative effort to innovate spearheaded by members of the institution directly affected student outcomes. That study parallels the Education Development Center initiative (2010) that provided laptops and technology coaches to 60 Indonesian schools (Ho & Burns, 2010). Those researchers reported that 100% of teachers saw an improvement in student behavior, increase in academic achievement, and higher computer proficiency (Ho & Burns, 2010). These studies' implications included the importance of having a "faculty champion", and that "research credentials of the reformer are more effective in persuading other faculty about the worth of a teaching innovation than either the data that support its efficacy or videotapes that demonstrate its merits or that students like it" (Breslow, 2010, p. 28).

**Mitigating barriers through support systems.** According to Efav (2005), there are five key attributes of effective knowledge sharing with new tablet technologies among faculty. First, explanations of glitches with the technology and steps to take help educators navigate around dilemmas. Second, warning of pitfalls with certain types of applications provide candid feedback on classroom successes and failures. Third, modeling classroom activities by mentors make tablet use pragmatic. Fourth, sharing a master list of applications and resources allow

innovation goals to be diverse, yet cohesive. Finally, connecting departments forms a culture of progress (Efaw, 2005).

The Eichenlaub et al. (2011) small-scale study mirrors these findings with educators who have agreed that their collaboration in learning the iPads encouraged cohesive organization and improved their overall learning within an interdisciplinary milieu. Jackson et al. (2013) report that the joining of departments gives a deeper insight into the culture that emerges at the university that also allows a unique transfer of knowledge among them. Though these studies are not designed intentionally as an interdisciplinary endeavor to accelerate learning, they inadvertently find it as a consequence of in-house collaborative efforts, which are propelled by personal and professional relationships.

**Lack of support systems.** Much of the literature imparts the importance of support systems, but some findings indicate a lack of support, leading to failed innovation programs. Burns (2013) conducted a meta-analysis of causal relationships between student learning and technology, and structures that led to pedagogical change. He admitted that it was more common to indict the dearth of human infrastructure and long-term support systems rather than the technology itself in failed innovation attempts (p. 38). Jones, Johnson, and Bentley (2004) had similar findings with their sample of 70 instructors who did not implement tablet technology into their teaching practices because they did not have a model from which to see its practical applications (p. 46).

Crook (2000) attributed these types of failed innovations to a lack of motivation that only peers could offer, stating, “Collaboration and motivation are strongly related: collaboration is a motivated activity because it has a distinct, important emotional dimension – collaborative settings evoke affective responses. What is so motivating in collaboration is shared meaning: both a sense of shared histories which learners build upon in collaborative activities, and that the shared history is unique to that particular group” (p. 165). This related directly to Zhao et al.’s (2002) evolution of a tech-savvy faculty in that as members grew together, using technology in mutually meaningful ways, departments evolved a culture of innovation. Afshari et al. (2009) explain that when educators became the agents of technology usage for pedagogical purposes, they facilitated the paradigm shift that was concomitant to this overarching evolution.

**Mentoring.** Some tablet technology integration programs went a step further by providing one-on-one mentoring. Hineman et al. (2015) conducted a small qualitative iPad study that investigated the impact of employing *tech leaders* on faculty adoption. They found that this dynamic afforded extensive opportunities to learn tech-based pedagogy that led to higher levels of technology self-efficacy among the faculty learners (Hineman et al., 2015). They asserted that high self-efficacy was a key ingredient to sustained iPad usage and positive student learning outcomes.

Herrington et al. (2014) conducted a one-year study that explored voluntary lunchtime technology sessions during which technical supporters provided

scaffolding of individual educators' tech knowledge to transform tacit knowledge into explicit knowledge. Expert performances gave them the contextual information needed to build their corpus of technology skills (Herrington et al, 2014).

Kukulska-Hulme (2012) found that the participant educators preferred the 1:1 support within the contexts of their technology skill level, subject matter, and learning objectives because they developed a rapport with familiar peers. This affective element was in line with what Conlon (2004) referred to as a *critical friendship*, and Sharples et al. (2007) determined that the emotional support system was integral to making learning personal and situated. In their position paper on the use of social constructivism to explore and learn mobile technologies, they highlighted that technology was meant to enhance learning environments not to create understanding or to replace conversations leading to understanding (Sharples et al., 2007, p. 8).

Synthesizing the findings of the aforementioned studies on collaboration dynamics exposed some common approaches to integrating tablet technology in the education setting among faculty. Hogue (2012) stressed the importance of pairing pre-adoption and post-adoption learners together to form a team for exploration. Second, school leaders and initiative leaders needed to seek out individuals who serve as long-term champions of the program, continually offering guidance and ideas within the contexts of the university culture, department, learner, subject matter, and student populations. This was akin to Dooley's (1999) findings that innovations tended to die within the first year if key stakeholders prematurely

departed. Third, various means for participants to share their experiences should be provided, be it one-on-one, group, formal, or informal settings. These opportunities should be plentiful and regularly scheduled to encourage consistency and accountability. It was noted that the discourse should reflect collective and individual beliefs of technology affordances to teaching and learning. Finally, a focus on improving each person's workflow using technology should elicit conversations describing contexts rather than product features (Hogue, 2012). An unexpected byproduct of such collaborative efforts was the recognition of educators' interdependence and a departure from isolated expertise. As Rodger (2002) stated, "no teacher outgrows the need for others' perspectives, experience and support – not if they are interested in being what Dewey calls lifelong students of teaching" (p. 857)

### **Critique of Ongoing Support for Innovation in Education Literature**

Much of the corpus of literature on support systems was comprised of position papers that were based on implications derived from meta-analyses of previously published works (Afshari et al., 2009; Baran, 2014; Becker & Riel, 2000; Carlson & Gaudio, 2002; Clark & Salomon, 1986; Cochrane, 2010, Cradler & Cradler, 1995; Crook, 2000; Hogue, 2012; Koole, 2009; Kopcha, 2010; Nordin et al., 2010; Sharples et al., 2007; Sharples et al., 2009; Zhao et al., 2002). Given the qualitative nature of support, the multiple angles in which support systems were viewed, and the various agencies that executed innovation, these reports carried weight in their implications. To analyze the human condition and to measure the impacts of

undergoing change in a pre and post fashion were goals of some social scientists, but in many cases these goals were not suited to be quantified. The studies included that were quantitative in nature were primarily surveys, whereas, the qualitative studies were mixed methods.

The samples used in the quantitative studies were predominantly small, making the findings non-generalizable. A suggestion from both empirical and rhetorical works was the need for large-scale research on the impacts of intensive, ongoing support systems of varying designs to determine most effective strategies. Anandam and Kelly (1981) believed that effectiveness referred to human satisfaction, but that endurance was governed by determination (p. 24). This leads to the discussion that support might need to veer toward that pedagogy, seeking programs that are enduring and reflecting the evolution that Zhao et al. (2002) referred to, rather than effective, since the topic is both individualistic and collective but generally subjective.

Although someone who is well versed in epistemological theory might see support systems for gaining technology knowledge through a social constructivist lens, the literature did not systematically refer to it as such to the degree it did in the learner-centered literature. Rather, authors focused more on the methodologies of evaluating the success or effectiveness of a program by the support systems, or lack thereof, reported as beneficial or not by its participants. This might be promising in the procurement of a new theory that many contemporary researchers are seeking to substantiate learning mediated by mobile technologies (Sharples et al., 2007;

Sharples et al., 2009). Evidenced by the distancing from referencing the social constructivist theory itself, the regurgitated use of social constructivism was not necessarily put to rest, but it is possible that the earlier assertion for a new theory to support this new epistemology is underway.

Researchers had ongoing support positioned as a multifaceted and contingent upon its participants' needs. For some, support meant a heightened awareness of educators' emotional responses to innovation (Afshari et al., 2009; Crook, 2000; Dahlstrom et al., 2013; Kulkuska-Hulme, 2012; Sharples et al., 2007). For others, support meant technical assistance in conjunction with pedagogical modeling (Becker & Riel, 2000; Carlson & Gaudio, 2002; Cradler & Cradler, 1995; Drouin et al., 2014; Efaw, 2005; Herrington et al., 2014; Hineman et al., 2015; Jones et al., 2006; Koole, 2009; Lefoe et al., 2009). In both cases, ongoing support was named as a key feature to consider when incorporating technology into teaching practices at any level and with all faculty of diverse proficiency.

Interestingly, very few articles refer to older technologies, such as desktops or laptops (Ho & Burns, 2010). One rationale is that the topic of ongoing support for effective innovation in university settings is more prevalent to ubiquitous mobile technologies that are emerging as a cultural mainstay. This refers back to Schwandt's (2007) hermeneutic contextualism, interpreting the needs of educators within the context of developing an aptitude with mobile technologies that are ever-present in and out of the classroom. Again, this is a paradigmatic shift that is taking place from the bottom up, which is the foundation for the argument against

hierarchical innovation designs of the past (Crook, 2000; Sharples et al., 2007; Yelland, 2009).

The recurring topics found in the literature that discusses democratic tactics for innovation in education include: educator choice, user ownership, learner-centered approaches, contextual considerations, and collaboration to support faculty in their innovation endeavors. Each of these areas touch upon what Crook (1996, 2000) and Smith and Kukulska-Hulme (2012) have termed as *ecology of collaborative learning*. In this respect, learning is seen as a negotiation of meaning, both through internal dialogue with one's various situated positions as well as through dialogue with others (Ludvigsen, Lund, Rasmussen, & Säljö, 2010). Sharples et al. (2009) refers to these conversations within the context of interactive technologies and ties in the concept of ecology within educative milieu:

People and technology are always in flux. This leads to learning as a conversational process of becoming informed about each others 'informings', to cognition as diffused amongst interactions and reciprocally constructed conversations, and context not as a fixed shell surrounding the learning, but as a construct that is shaped by continuously negotiated dialogue between people and technology. We shall indicate how this allows us to understand the ecologies of learning in a world of negotiated networked mobility (Sharples et al., 2007, p. 4).

This concept is viewed as a new epistemology, socially constructed knowledge and meaning of mobile technology through conversation (Sharples et al., 2009). These

conversations embody what took place in democratic innovation because they bridge learning and context.

## **Reflection**

*In discovery of the detailed connections of our activities and what happens in consequence, the thought implied in cut and dry experience is made explicit...Hence the quality of the experience changes; the change is so significant that we may call this type of experience reflective – that is, reflective par excellence (Dewey, 1944, p. 170).*

Approximately half of the articles included in this review implied the importance and positive impact of reflection for successful mobile technology implementation in school settings. Reflection was not prevalent in research until the late 1980s when paradigms shifted toward qualitative means to evaluate teaching practices (Cochrane-Smith & Lytle, 1993; Schön, 1983). These self-studies were biographical, narrative, and included ethnographic data that proved to be viable forms of inquiry if systematically executed, particularly for educators facing diverse student bodies and technological advances (Samaras & Freese, 2009). The types of research questions that surfaced in research warranted more qualitative methods to address various complicated and contextual issues in classrooms (Samaras & Freese, 2009).

**Reflection as self-study.** Self-study was equated to reflexive practices in that the purpose was to improve on various levels, professionally and personally, given the propensity of educators to consider their profession as part of their personal identity (Nordin et al., 2010; Schön, 1983). Identity, then, was seen as

multifaceted construct developed through dialogic conversations, meaning the different positions one took that were relative to their setting and counterparts.

Mikhail Bakhtin (1895-1975) (1981a), a Russian philosopher and semiotician, advanced this idea of identity by actualizing positions that were in line or juxtaposed to other positions within one's self (dialogism) (Shields, 2007). His school of thought was housed in the semiotics of meaningful exchanges and introspections within conversations. Conflicts that led to new insights were resolved through reflection and inherently dialogic.

Dewey's (1933, 1938) vision for education included reflexive thought about experiences to gain meaning behind actions and to provide a guide for accomplishing educational goals. Reflections helped to develop a common language, so shared insights could be transformative to a group of which educators subscribe (Gee & Hayes, 2011). The main difference lied between reflective and reflexive activities. Reflective entailed recollecting past experiences to make choices for the future. Reflexive practices delved deeper into the reasons behind choices for a more introspective look into why a person comes to their decisions.

**Reflection as professional development.** In maintaining the spirit of democracy and the respect for individuality in the quest to innovate, I narrowed the scope to purposeful reflexive activities. These activities were carried out within a community setting in which collective aspirations of improving education through integrating technology into teaching practices was valued. Reflections were

credited as a qualitative data source for determining effective teaching practices for individual educators participating in this study (Moustakas, 1994; Patton, 2002).

For an educator to reflect on one's practices, and for it to have an impact on teaching and learning, according to Dewey (1933), it needed to meet four criteria. The first was that it aspired to make meaning of experiences, so an educator could move from one stage in their professional development to the next. This deeper understanding allowed them to vouch for advancements in the field not only as individuals but also as members of society. Second, reflection had to be systematic in its execution, so it revealed rigor in exercises that were rooted in scientific inquiry. This systematic approach intended to provide reliability and validity to others planning to innovate incorporating reflexive methods. Third, reflection was a community endeavor, which was executed individually but influenced and substantiated by the group. As Kegan (1994) put it, "deciding *for* myself should not be confused with deciding *by* myself" (p. 219). Fourth, reflection required an attitude of progress that was both positive and realistic (Rodger, 2002). These criteria addressed the intrinsic drive to innovate by including the semiotics of technology thorough reflection (Grabe & Grabe, 1998; Jones et al., 2004; Sharples et al., 2007).

Motivation to propel science and education forward is an endeavor that cannot be imposed upon educators if it is not a personal and professional goal (Cochrane, 2010; Harris & Hofer, 2009; Ouzts & Palombo, 2004; Zhao, 2013). Researchers addressed the need for community, so interactions with peers could

expound on institutional goals to innovate through productive and purposeful conversations (Becker & Riel, 2000; Bennett et al., 2012; Crook, 2000; Dawson, 2007; Dexter et al., 1999; Efav, 2005, Eichenlaub et al., 2011; Herrington et al., 2014; Pellegrino, 2007; Scagnoli & Hong, 2012). Yang's (2009) interpretation of critical reflection was that it was the most important interaction within the professional setting because it "encouraged teachers to take a stand through questioning and challenging others' underlying assumptions, which was a way for teaching practices to be improved and for the conditions in which schooling takes place to be made more just" (p. 11).

Looi, Sun, Seow, and Chia (2014) conducted a small-scale study on how teachers explored online activities and executed them in classroom settings to determine commonalities benefitting both dynamics. Situated and reflective activities were identified as most significant when supporting both teacher and student learning about how to integrate mobile technologies. Such activities embodied the learning objectives of the course and connected technical tools to differentiated pedagogical approaches, making their learning transferable to other objectives and subjects. Lefoe et al. (2009) asserted that transfer of knowledge was more easily obtainable if reflection on meaning and diversification of uses were incorporated. It was easy to connect these findings to Baran's (2014) propositions of learning *with* technology, not *about* technology, because of this transference implication. If the foci were solely technical, the meaningful pedagogy would

inevitably suffer because transference would be minimized to only one aspect of innovation (Baran, 2014).

Schuck et al. (2013) reported that some reflexive activities in their small study on collaborative exploration of mobile devices included tweeting and blogging about experiences during the process. The benefits of these platforms were three-fold: they facilitated more experiences with mobile technology, allowed reflection, and collected feedback from their community members. This was what Bennett et al. (2012) referred to as having an “awareness of practice,” whereby an individual could reflect on where he or she was and where he or she wanted to be with mobile technologies (p. 528).

**Being reflexive of technology use.** Carlson and Gaudio (2002) analyzed data on teacher recommendations for innovating teaching practices. They reported being critical, reflecting, and joining a community were key components to their evolution. Efav (2005) observed the routines of educators who experienced mobile technology integration seeing that once they witnessed how a mentor implemented technology they practiced it within context then reflected on what succeeded, failed, or needed adjustment. These reflections provided them with pathways on which to travel during their process of changing their practices.

Dexter et al. (1999) uncovered that educators who employed progressive practices as they developed their skills, both technical and pedagogical, did not feel the technology itself was the catalyst for change, but rather their reflections and the culture of the institution prioritized their experiences as catalysts. Similarly, Geist’s

(2011) iPad study discovered that constant evaluation of learning experiences helped uncover some deep-rooted feelings about themselves as educators and ideas of how to address shortcomings. Furthermore, Herrington et al. (2014) asserts the need for cycles of reflection; as goals changed over time, reflections could serve as baselines from which to gauge progress.

**Communities of reflection.** Articulation of concerns, goals, and successes simultaneously provided an audit trail for community members to follow. The hitch here was what Dewey (1933) referred to as minimizing reflection to a checklist of behaviors; whereby, the practice of reflection was simply a narrative of items addressed in a superficial fashion to satisfy some underlying pressure to participate. To combat the demise of reflection, Dawson (2007) recommended designing one's own reflexive practices that could inspire others. A professional culture of reflection could prosper in conjunction with diversified technology usage by sharing experiences and developing diverse tactics within an innovating community (Dewey, 2008; Sharples et al., 2007).

Rodger (2002) emphasized the importance of a collective understanding of reflection by outlining some issues that could potentially arise from vague definitions. First, educators may be confused by the differences between reflection and other forms of thought, such as creativity. Second, when assessing reflection proficiency, educators could misconstrue a collection of evidence as a cultivation of evidence. The difference was that the cultivation of evidence represented authentic development of a paradigm through reflection, as opposed to collections of writings

that simply reported experiences in portfolio fashion. Third, a lack of common language could confuse members who may believe, for example, that metacognition was the same as reflection. A common language facilitated communal thought. Fourth, research could suffer if the effects of reflexive activities did not translate to teaching practices or student outcomes (Rodger, 2002, p. 844).

To address these potential risks and to guide practitioners in their use of reflection as a promoter for change, Rodger (2002) proposed four phases of reflection: presence in experiences, description of experiences, analysis of experiences, and intelligent action (p. 856). By virtue of democratic tactics, these steps reinforced individual educators' choice to experience various affordances of mobile technologies, what their experiences looked and felt like, the impact of these experiences on their teaching practices, both positive and negative, and, finally, what subsequent steps to take (Rodger, 2002). For anyone unfamiliar with reflexive practices, these steps may serve as a guide for developing thoughts in a systematic way, using experiences to reason that is essential for knowledge (Koole, 2009; Vygotsky, 1978).

### **Critique of Reflection Literature**

The topic of reflection was mentioned frequently in research literature on teacher training for technology integration as a means for evaluating innovation experiences (Baran, 2014; Carlson & Gaudio, 2002; Hogue, 2012; Koole, 2009; Rodger, 2002; Sharples et al., 2007; Sharples et al., 2009). In this regard, reflection tended to serve as a summative assessment of the process rather than a formative

component of innovating, which may or may not assist in changing practices. This was where an important and obvious gap existed in the literature: a lack of empirical evidence of the influence of reflection on teaching practices and student outcomes. Baran (2014) echoed this sentiment in his recommendation for more research on the outcomes of different programs that address issues that are endemic to educators.

Similar to the topic of ongoing support, the majority of the research used mixed methods, collecting both survey data and interview data or teacher focus group discussions (Bennett et al., 2012; Dexter et al., 1999; Geist, 2011; Kukulska-Hulme, 2012; Smith & Kukulska-Hulme, 2012). This allowed researchers to quantify the efficacy of various elements of an innovation as well as incorporate educator experiences and opinions. Such research designs alluded to the importance of being aware of one's teaching practices, various catalysts of change, and the significance of ongoing assessment (Bennett et al., 2012; Dexter et al., 1999; Geist, 2011).

Several articles are meta-analyses of articles based on various professional development designs reported by educators and/or observed by research teams (Baran, 2014; Hogue, 2012; Koole, 2009; Parsons, Ryu, & Cranshaw, 2007; Sharples et al., 2009). This information is useful for larger-scale innovations because it provides a broader lens on the phenomena. What is prominent in the literature on reflection are the few studies that relied solely on reflection or journaling as a data source (Efaw, 2005; Kazempour & Amirshokohi, 2008, Lefoe et al., 2009; Liu et al., 2008; Rossing, Miller, Cecil, & Stamper, 2012). The emergence of reflection into

scientific inquiry is promising in the realm of education because it validates this qualitative method for obtaining credible affective data to improve teaching practices relative to the needs of individual educators within the context of their experiences. These points constitute the premise behind my research and the gaps that I address in this study.

John Dewey (1859-1952), a pillar in the literature on reflexive practices, was a proponent for theories on education and epistemology. The consistent reference to Dewey led to this theoretical framework that incorporated his precepts of knowledge acquisition, such as reflection and collaborative learning through *conversation* (Dewey, 1944, 2008). Dewey's (2008) perspectives on conversation were rooted in the drive for authentic knowledge gained in dialectic exchanges with others, thus marrying the two theories in this study (p. 22). For the purposes of this research, conversation included ongoing dialogue among members of a community exploring mobile technologies and dialogic conversations with one's self to determine technology applications within the ecology of their collaborative learning (Bakhtin, 1984a, 1984b, 1984c).

### **Common Models for Innovation in Education**

From a historical perspective, six common models for innovation are summarized in this section in order of establishment to provide insight into the emergence of systematic democratic innovations. I compare and contrast these models to further substantiate democratic tactics that are surmised by obvious presence or absence of key elements within each model and subsequent progressive

concepts of innovation in education that emphasize human agency. In addition, the National Education Technology Standards for Teachers (NETS-T) is reviewed to demonstrate expectations of educators' technology use in classrooms and shifting pedagogies toward technology integration (ISTE, 2002).

### **Diffusion of Innovations**

The diffusion of innovations (DoI) theory was developed by Everett Rogers (1962), professor and rural sociologist, to explain how and for what purpose a technological advance gets embedded within a culture. This framework was not unique to the education field but rather a sociological exploration tool to determine the degree and rate of diffusion within societies (Hogue, 2012; Rogers, 1962). Hogue (2012) states that the diffusion of technology within the education system was a strong indicator of the pervasiveness of that particular technology, such as tablets and is manifested through teaching practices.

The paradigm of DoI emphasizes innovation as a social phenomenon, which is transmitted by members within the same cultural milieu and is influenced strongly by the option to choose to innovate. Rogers (1962, 1983) ascribes four influential elements of this diffusion process: the technology itself, channels of communication, periods of time, and intact social systems. He further breaks down members of a social system into categories related to their rate of adoption: innovators, early adopters, early majority, late majority, and laggards (Table 3: chart below) (Rogers, 1962, p. 150). He proposes that the diffusion process is a five-step process that is contingent on the types of communications taking place around the

technology, which includes awareness, interest, evaluation, trial, and adoption (Rogers, 1962, 1983). Ultimately, experiences of individual explorers of the technology determine if they accept or reject integrating, but if the diffusion process persists, they become laggards and fall out the status quo.

### **Concerns Based Adoption Model**

The Southwest Educational Development Laboratory (SEDL) developed the concerns based adoption model (CBAM) in 1966. The primary focus of the CBAM is to guide education organizations of all sorts through a change process. The unique slant is a measurement of individuals' concerns and their degrees of implementation over time that provides education leaders with empirical evidence of change (Hall & Hord, 1987). This framework is particular to education departments in all types of organizations, such as public schools, marketing companies, commercial businesses, and so forth.

Yang, Kim, Kim, and Kim (2013) used the CBAM to analyze 133 teachers who underwent an initiative to implement differentiated instruction into their mathematics program in Korean schools. They determined that over time concern decreased and use increased above previous standard practices. This provided enough evidence to shift their policies and teacher training objectives toward differentiation (Yang et al., 2013).

### **Technology Acceptance Model**

The technology acceptance model (TAM) was first presented by Fred Davis in 1985 and measures the perceived use and ease of use of technology in conjunction

with the subsequent degree of use by individuals (Legris, Ingham, & Collette, 2003). It does not entail a set protocol; rather, they suggest a model from which to collect qualitative data for synthesis.

Vazquez-Cano (2014) conducted a mixed methods study with 388 higher education students using the TAM model to explore didactic uses of smartphones and applications for learning purposes. He found that reviewing content in narrative form, or story form, allowed students to personalize their learning experiences while demystifying the devices as learning tools, resulting in a subsequent increase in use and ease of use for that purpose (Vazquez-Cano, 2014). Another study by Park (2009) examined the adoption process of e-learning by 628 university students in Korea using the TAM model. He reported that the TAM model was effective in assessing perceived usefulness, ease of use, and a behavioral intention to increase e-learning activities (Park, 2009, p. 150).

### **Technology, Pedagogy, and Content Knowledge**

The Technology, Pedagogy, and Content Knowledge (TPACK) framework was inspired by the work of Lee Shulman's (2005) construct of pedagogical and content knowledge with technology added as an area in education that is pertinent to current education infrastructures. Mishra and Koehler (2006) provide extensive research using this framework to address technology evolution in education. In the TPACK framework, Content Knowledge, Pedagogical Knowledge, and Technology Knowledge combine to address the ecological layers of teaching and learning in a global economy and networked society. The TPACK framework for innovation in its

expanded form by Mishra and Koehler (2006) remains in the education field for innovation purposes, particularly in response to the onslaught of mobile technology proposals for school districts (Harris, Grandgenett, & Hofer, 2012).

### **Community of Practice**

Jean Lave and Etienne Wenger (1991) developed the community of practice (CoP) approach in their release of *Situated Learning: Legitimate Peripheral Participation*. This groundbreaking theory provides a purely qualitative approach to innovation that attributes authentic learning to social constructs comprised of people reflecting on a shared vision of change. Collective learning reflects the culture of an organization through the pursuit of their enterprises in democratic and dialectic fashions (Sharples, 2005; Sharples et al., 2007; Valsiner, 2002; Wenger, 2000). The overall premise of CoP is that social exchanges among community members manifest into shared practices that became part of the group's identity (Jackson et al., 2013; Wenger, 2000).

One example of a CoP was Yang's (2009) exploration of 43 pre-service teachers who shared a blogging site to critically reflect on their teaching practices and to build community online. He reported that he had 100% participation on the online blogging site, continuous dialogue, and a consensus that this platform was instrumental in developing a CoP (Yang, 2009). A unique characteristic of CoP is that researchers can purposefully design a group or they can form naturally as a result of shared experiences, which are indications of human agency facilitating transitions.

## **National Education Technology Standards for Teachers**

The National Education Technology for Teachers (NETS-T) project was developed by the International Society of Technology in Education (ISTE) accreditation, a standards committee comprised of 52 educators, administrators, and technology coordinators at Wheeling Jesuit University (ISTE, 2002). Their mission to “promote appropriate uses of technology to support and improve learning, teaching, and administration” was reflected in five performance indicators, or factors, for educators listed below. Their purpose was to assess learning in classrooms and to engage students and teachers in the learning process with technology (ISTE, 2002):

- 1) *Facilitate and Inspire Student Learning and Creativity* (Factor One).
- 2) *Design and Develop Digital-Age Learning Experiences and Assessments* (Factor Two).
- 3) *Model Digital-Age Work and Learning* (Factor Three).
- 4) *Promote and Model Digital Citizenship and Responsibility* (Factor Four).
- 5) *Engage in Professional Growth and Leadership* (Factor Five).

By virtue of these five indicators, demands of a global economy were realigning teaching practices to student outcomes. Elements of quality programs shifted in the wake of a new technology infused pedagogies and the NETS-T factors provided a guide for this process (ISTE, 2002; Sharples, 2005; Yelland, 2009).

Levin and Camp (2002) conducted a study on the reflection cycles of educators innovating in a district in North Carolina, using the NETS-T to justify how their artifacts within their technology e-portfolios met national standards.

Evaluations were based on several criteria, including an organization of their reflections to “appraise their evidence against their effectiveness for teaching and learning as well as against the goals, values, and philosophy of the NETS-T standards” (Levin & Camp, 2002, p. 575).

### **Synthesis and Critique of Common Models Literature**

From a historical perspective, there has been an evolution toward human agency for innovation since the 1960s. In the DoI model, awareness of practices and interest in change stemmed from formal and informal communications (Rogers, 1962). The inception of innovation as socially constructed was pivotal in research and practice. The CBAM model considered concern as the key factor in change. This showed a personal and affective slant on innovation (Hall & Hord, 1987). The TAM model took an individualistic approach by relating specific technologies to ability levels of users and their progressive competence (Legris et al., 2003). TPACK considered multi-facets of individual’s knowledge that combine to develop profiles, adding the contextualization of innovation (Mishra and Koehler, 2006). CoP relied heavily on social exchanges and the unique interests of groups to innovate (Lave & Wenger, 1991). Human agency clearly became a nucleus in education research literature on innovation and the impetus of contemporary qualitative research to find commonalities that affect student outcomes.

In synthesizing these common models, several themes emerged from their designs and purposes. The first was *choice*. The TPACK, TAM, and CBAM were all tools chosen by figureheads or policy makers for institution-wide innovation and

were not associated with democratic tactics (Hall & Hord, 1987; Legris et al., 2003; Mishra & Koehler, 2006). They had elements of choice in regard to what educators choose to do in their classrooms, but these were primarily geared to measure overall improvement.

The second theme was *time*. The DoI, CBAM, and CoP accounted for change over time using multiple measurements, both for individuals and groups (Hall & Hord, 1987; Rogers, 1962; Lave & Wenger, 1991). The TPACK and TAM resembled *snapshots* of individual technology implementations that were useful for determining issues at hand but did not address the time or steps necessary to ameliorate those issues for smooth transitions in future endeavors with education technology (Legris et al., 2003; Mishra & Koehler, 2006).

The third theme was *affect*. The DoI, CBAM, and CoP addressed affective impacts of innovation on educators, such as concern, support, and fear (Hall & Hord, 1987; Lave & Wenger, 1991; Rogers, 1962). These affective aspects showed implications on technology integration in the classroom; therefore, their inclusion in the evaluation of teaching practices provided a more holistic perspective. TAM and TPACK lacked an affective element largely due to their hierarchical underpinnings (Legris et al., 2003; Mishra & Koehler, 2006).

The fourth theme was *target*. The TPACK, TAM, CBAM were designed to evaluate individuals as members of a faculty body (Hall & Hord, 1987; Legris et al., 2003; Mishra & Koehler, 2006). Individualized attention allows practitioners and leaders to design innovation plans within context has potential to minimize

resistance. The DoI framework targeted society, analyzing particular technologies' integration into various societal branches. The CoP targeted groups of people engaged in a lengthy process of change in a forum type design. In democratic innovations, participants of an innovation determine the target; otherwise, it is hierarchical (Dahlberg & Moss, 2004).

The fifth theme was *social*. The DoI and CoP were the only two methods that were designed around social constructs for innovation. They were based on theories that proposed how relationships foster innovation through support, dialectic reflection, and conversation. Although the CBAM included exchanges with researchers, facilitators, and technical support, they were not integral to change through social dynamics but rather rubrics and guidelines, making it minimally social in design.

Table 1

*Synthesis of Themes from Common Models for Innovation in Education*

	<b>DoI (1962)</b>	<b>CBAM (1966)</b>	<b>TAM (1985)</b>	<b>TPACK (1987)</b>	<b>CoP (1991)</b>
Choice					✓
Time	✓	✓			✓
Affect	✓	✓			✓
Target	Society	Individual	Individual	Individual	Group
Social	✓				✓

The rationale for including this section is to highlight fluctuating paradigms of innovation regarding human agency. Although the CoP model includes all elements it lacks choice by the individual to change. The purpose here is to illustrate innovation like the color spectrum; there were many shades or degrees of implementation. To begin to explain the multiplicity of shades a dialogical model of innovation is introduced; although, *not* traditionally applied to innovation it fits the need to inquire about the shifting paradigm toward human agency upheld in the NETS-T Factors and, ultimately, in this study (Bakhtin, 1981a).

### **Theoretical Framework**

The theoretical framework of this research is comprised of four elements: democratic tactics, Dialogical Self Theory (DST)(Bakhtin, 1981a; Hermans, 2001; Shields, 2007), innovation texts/NETS-T factors (ISTE, 2002), and Sharples' (2005) concept of cultures of innovation. Democratic tactics shed light on what happens during a bottom up innovation. DST frames the data so reports collected within the community and classroom contexts reflect the dialogic relations that evolve over time and practice using student iPads (Aveling et al., 2014; Shields, 2007). Innovation texts are essentially teaching practices in traditional or tech-in-hand dynamics (Bakhtin, 1981a). The NETS-T factors categorize these practices (ISTE, 2002). Cultures of innovation represent student opinions about their tech-in-hand experiences and considerations of iPad usage in their professional futures working with young children and families.

Rodger (2002) states, “teachers must be able to think systematically about their practices and learn from their experiences. They must be able to critically examine their practices, seek the advice of others, and draw on education research to deepen their knowledge, sharpen their judgment, and adapt their teaching to new findings and ideas” (Rodger, 2002, p. 843). This framework, thus, situated innovation in education as a process that is contingent upon the nature of its onset, the culture surrounding it, agencies of change, and the diffusion of technologies that evolved as cultural artifacts to be determined by all members within that culture.

### **Democratic Tactics**

Democratic tactics for innovating with mobile technology in higher education is the broader lens applied to this review. Dewey’s (1903) and Morrow’s (2009) concepts of democracy and conversation are pillars in the research literature that provide the foundation upon which I build an argument for democratic tactics for innovation among educators. Democracy in this capacity is the view that true learning is intrinsically driven and immortalized through a series of experiences each individual has as they live within this globalizing world (Dewey, 1903, 1933, 2008; Kopcha, 2010; Morrow, 2009). Placed within the context of innovation, past experiences with technology influence present practices and from these experiences a vision of technology’s role can be formed for the future (Afshari et al., 2009; Jones et al., 2004; Koole, 2009).

Bottom up growth with on-going support allows learners to gain ownership of their learning and the ability to transfer their knowledge to different contexts

(Bayar, 2014; Bennett et al., 2012; Carlson & Gaudio, 2002; Clark & Salomon, 1986; Cochrane, 2010; Cradler & Cradler, 1995; Dexter et al., 1999). Conversation was, thus, the interaction that piques interest that potentially leads to change, which is the essence of reflection (Dewey, 1933; Drouin et al., 2014; Efaw, 2005; Herrington et al., 2014; Hogue, 2012; Kazempour & Amirshokoochi, 2008; Kukulska-Hulme, 2012; Rossing et al., 2012; Sharples et al., 2007; Sharples et al., 2009).

Conversations can be purposeful as in formal education but they can also occur informally through everyday exchanges (Becker & Riel, 2000; Lefoe et al., 2009; Vazques-Cano, 2014). Dewey (2008) addressed both democracy and conversation stating:

Beliefs cannot be hammered in; the needed attitudes cannot be plastered on. But the particular medium in which an individual exists leads him to see and feel one thing rather than another; it leads him to have certain plans in order that he may act successfully with others; it strengthens some beliefs and weakens others as a condition of winning the approval of others. Thus, it gradually produces him a certain system of behavior, a certain disposition of action. The words 'environment,' 'medium' denote something more than surroundings which encompass an individual. They denote the specific continuity of the surroundings with his own active tendencies. An intimate being is, of course continuous with its surroundings; but the environing circumstances do not, save metaphorically, constitute an environment (p. 15).

Democracy and conversation exist in a liminal sphere with Bakhtin's (1973, 1981a, 1984, 1986a, 1986b, 1986c) Dialogical Self Theory (DST). The connection between the two lies in the social nature of progress that influence both internal and external positions of educators on any given topic. Additionally, Dewey (1903, 1933, 2008) and Bakhtin (1973, 1981a, 1984, 1986c) share the view that learning is inherently reflective and contingent upon context.

### **Dialogical Self Theory**

Mikhail Bakhtin (1895-1975) lived during the Russian Communist era of Joseph Stalin and was known as a prolific philosopher of language and a critic to the literary work of novelists of his day. Embedded in his philosophy and pedagogy as a previous schoolteacher is the notion of multiplicity of voices within individuals. The pursuit of truth according to Bakhtin was contingent upon the juxtapositions of voices that are actualized through dialogue with inner others and others, namely, through dialogic relations (Aveling et al., 2014; Shields, 2007).

Bakhtin's (1981a) concept of dialogism had been applied in social science and psychology fields to identify personal position repertoires manifested within a complex web of interactions with one's environments, constituents, and subsequent personal identities. The shift toward more holistic and social research methods qualified the use of this theory to examine epistemologies within context (Hermans, 2001). Various researchers had employed qualitative methods given the nature of sociocultural authentication to be extremely subjective and heuristic, that is, subject to interpretation. Those methods depend on the research purpose, which meant

there was no set method for analysis but rather principles to consider when utilizing this theory (Aveling et al., 2014; Linell, 2009; Marková, 2003).

Aveling et al. (2014) consolidate the principles of DST into four precepts: context, multiple interpretations and uncertainty, interpretive skill and contextual knowledge, and reflexivity of the researcher in regard to their influence on the interactions during research (Linell, 2009). They state that although there was no rubric from which to determine quality of DST to support ethnographic research these principles provide guidance in adhering to DST precepts.

Wertsch (2004) applies DST to pedagogy in numerous works and state that contextual interactions between students and teachers propagate multiple voices within and among all actors. Mortimer (1998) investigated the relativity of voices between students and teachers using DST and Grossen, Zittoun, and Ros (2012) studied the impact of leaders' voices in meaning making and knowledge. Akkerman, Admiraal, Simons, and Niessen (2006) analyzed group dynamics in Dutch universities and the mechanisms that drew upon diverse individuality to develop collective individuality, which demonstrated the continuous negotiation between voices (p. 227).

Studies of this sort call upon holistic perspectives and cultural nuances in language that are interpreted by an investigator who is in direct contact with the participants and the culture in which they reside. Multivoicedness or what Bakhtin (1981a, 1981b) refers to as *heteroglossia* represents the amalgamation of individuals' inner dialogues as they seek truth behind actions, thoughts, and goals

(Aveling et al., 2014). In applying this theory to my research it is the heteroglossia of professors that I explore to determine if the process developing heteroglossia influence teaching practices and student opinions of learning with iPads as innovative or otherwise. I attempt to bridge democratic experiences of educators to a culture shift at Texas Woman's University by connecting the conceptualizations of educators using the DST lens in the analysis.

### **Innovation Texts**

In Shield's (2007) book, *Bakhtin Primer*, she discusses Bakhtin's concept of *texts* that are structures similar to other fabricated cultural products subject to critical analysis (Bakhtin, 1981a; Shields, 2007, p. 66). Teaching practices with student iPads determined within professors' conversations and classroom exchanges are considered innovation texts within this research. Bakhtin (1986a) explains that in social sciences there is always, at least in part, an investigation on the relationship between the ready-made text, or pre-conceived notions, and the reactive text, or new understandings (p. 106-107). Within the context of innovation and teaching practices, pre-conceived notions comprise thoughts on what technology is supposed to look like or has looked like in practice while, reactive texts are the pragmatic implications of student iPads. Prevailing positions and actions with technology stem from juxtapositions and resolutions of dialogic exchanges among each professor (Bakhtin, 1986a, Hermans, 2001; Hermans & Hermans-Konopka, 2010; Shields, 2007). Hermans and Hermans-Konopka (2010) stated that, "The special nature of dialogue is that it copes with uncertainty by going

into this uncertainty rather than avoiding it. Entering a dialogue, with other individuals or with oneself, opens a range of possibilities that are not fixed at the beginning but remain flexible and susceptible to change during the process itself” (p. 46).

A number of research studies had employed the DST lens to uncover the roots of such constructs as teacher identity, diversity of self-narratives in form and function, and developmental origins of identity of children, new parents, and cultural transitions (Akkerman & Meijer, 2011; Hermans and Hermans-Konopka, 2010; Stemplewska-Zakowicz, Zalewski, Suszek, Kobylińska, & Szymczyk, 2014). Implications from such studies point to an innate propensity of multiplicity of every human who engages in the world around them and the aggregation of identities to form a whole or unique personality (Hermans & Oles, 2013). In the transition of teaching practices from traditional to tech-in-hand dynamics identities expressed through teaching practices are proposed to reflect a dialogical formation of the self.

### **Culture of Innovation**

The ultimate purpose of much research in education is to determine influence of these experiences with student iPads on student outcomes. The theoretical framework is designed to explore the influence of educator’s dialogically determined practices with student iPads in classroom settings on student perceptions about and considerations of technology-mediated learning that prime a culture of innovation at Texas Woman’s University (TWU).

In reference to the literature on school cultures Sharples (2005, 2007; Sharples et al., 2009) regards the semiotics around technology as a cultural sign. The ever-shifting dialogue between technology and users further develop “the ecology of learning in a mobile and networked world” (Kukulska-Hulme, 2012). Ravencroft (2000) argues that agency was not reserved for the individual or technology in isolation, but rather, in the “democratic synergy of both together” (p. 248).

### **Advocacy Statement: Review Synthesis and Connection to Research**

Ethnographic research requires multiple elements to create a detailed picture of the actors and experiences under investigation (Patton, 2002). To provide a rationale for the elements in this review, each section is succinctly revisited to advocate for their incorporation into this study. These elements are strewn throughout the framework that structures the data into a cohesive body of evidence of democratic experiences impacting the process and subsequent culture of innovation.

### **Bottom Up Innovation (Ownership, Context, Learner-Centered)**

Bottom up innovation supports the idea that good practice is formulated internally (Conlon, 2004). Exploration is the basis of how that took place (Nordin et al., 2010; Sharples et al. 2007). Promoting ownership through the personalization of technology provides the agency educators need to determine if technology is beneficial to their workflow and matches their teaching and learning paradigm (Kearney & Maher, 2013). Finally, contextualizing technology (learning with

technology, rather than about technology) recognizes ecology of mobile learning and the semiotics behind its affordances (Kukulska-Hulme, 2012; Sharples, 2007). With the lack of purely qualitative research on the spectrum of integrations, this research provides some structure to a conceptual framework that is both ethnographic and pragmatic, without asserting the common formulation of profiles or step-by-step instructions (Baran, 2014).

### **Ongoing Support (Collaboration/Community, Mentoring)**

Zhao's et al. (2002) evolution of innovation in education, Lefoe's et al. (2009) implications of *how* educators learn, Kukulska-Hulme's (2012) assertion that learning takes place with technology, Schwandt's (2007) hermeneutic contextualism respecting interpretation and contexts of innovation, and shifting innovation from procedural toward conceptual knowledge regards educators as learners, substantiating the assertions of this research. With semiotics in mind, it is essential to understand that support cannot be categorized; rather, it is the glue for ecology of collaborative learning (Crook, 1996, 2000).

### **Reflection**

Reflection is the means for accountability for teachers (Dewey, 2008). It is both intellectual and affective - a means for authentic development, a productive reaction to experiences, a retrospective view of one's own professional actions that can only take place within a community, and it is most beneficial when it is intentional (Ghaye, 2010). This research deems reflection of practices and

experiences, both individual and collective, as the *cultivation*, not a collection, of evidence of innovative teaching practices.

### **Common Models for Innovation in Education**

Elements of change include choice, time, affect, target, and social constructs. In terms of *inconsistency* in models, the framework of this study argues for *conceptual* innovation that includes *all* elements, evidenced by experiences with innovation rather than generalized innovation evidenced by checklists and categorized profiles.

### **Summary**

This chapter reviews the literature on democratic tactics and historically common models for innovation, exposing a gap in the literature connecting dialogic experiences during democratic innovation to teaching practices within student tech-in-hand classroom settings. Further, there is little to no evidence of how democratic tactics impact university cultures and subsequent early childhood settings. The theories and paradigms presented here support the purpose of this research to connect these aspects of innovation to change with mobile technologies, matching the vision set forth by invested members of the university culture to the agency of the professors who actualize it. To make these connections, it is reasonable that an ethnographic account of democratic innovation experiences of educators and *how* these experiences shift teaching practices toward conceptual technology integration through dialogism be systematically explored. The method for such an endeavor of contextual exploration is presented in the next chapter, using the paradigmatic lens

of a researcher who is dedicated to improve both student outcomes and verisimilitude in social science research.

## CHAPTER III

### METHODS

This study was an extension of a pilot study I initiated in 2015, an ethnographic investigation of innovation experiences of three university professors and their students shaped by ongoing discussions of uses and capabilities of newly acquired student iPads at Texas Woman's University (TWU). These discussions captured changing teaching practices in Early Childhood and Family Science courses that entailed continuous negotiation. Negotiations, in this sense, were considered *juxtapositions* because professors entered and exited discussions with sometimes shifting notions about iPads for students. Professors' bottom up enterprise, or self-initiated agendas to enhance teaching practices with iPads, illustrated how pedagogical shifts occur in democratic fashions (Dewey, 1904, 2008; Morrow, 2009; Moss, 2011). The term *democratic* implied freedom to choose as the professors saw fit within the parameters of the infrastructure and teaching goals for each course. Moss (2011), an advocate for democracy in all levels of education, stated:

Democratic practice in early childhood education and care must operate at several levels: not just the institutional that is, the nursery or preschool, but also at national or federal, regional and local levels. Each level has responsibility for certain choices, using "choice" to mean the democratic process of collective decision making for the common good (p. 2).

iPads were used during two exploratory semesters, and this laid the foundation for developing teaching practices geared toward future child and parent educators, advocates, and family and consumer science specialists using a new technology tool. If the professors' democratic processes and subsequent teaching practices influenced adoption or consideration of using iPads in the same ways with children and families, it was proposed here as developing a culture of technology mediated learning.

### **Theoretical Framework**

The theoretical framework of this research is comprised of four parts: democratic tactics (Dewey, 2008), teaching texts and factors (ISTE, 2002; Shields, 2007), Dialogical Self Theory (Bakhtin, 1973, 1981a, 1981b), and culture of innovation (Sharples et al., 2009). Each of these elements is designed as stepping-stones to make shifting pedagogies visible.

#### **Democratic Tactics**

Inspired by John Dewey (1903), democratic tactics are bottom up innovation strategies that align with the literature and describe educators' experiences as they explore student iPads. These tactics have broader descriptors: bottom up, on-going support, and reflection.

**Bottom up.** Bottom up is a term used to imply three separate areas in the democratic literature. The first is ownership or the ability of professors and students to manipulate iPads physically and in digital spaces. Bottom up includes context that describes using iPads for specific purposes based on course agendas.

Lastly, it includes learner-centered activities that reflect professor's choices, interests, strengths, and weaknesses as they pertain to using student iPads in their classrooms. Dewey's (1903) quote supports these concepts of developing of ideas and of self through choice, "The self is not something ready-made, but something in continuous formation through choice of action" (p. 408).

**On-going support.** On-going support portrays the community the three professors built. It involves mentoring with iPads that ensues among them and among their students. Mentoring has a connotation of guiding others on a topic of expertise, which varies from person to person. This type of purposeful communication allows professors and students to mutually possess the knowledge of the expert (Dewey, 1903).

**Reflection.** Reflection is the third broader democratic theme that represents both reflective and reflexive activities. The term reflective is synonymous to recollections that influence future actions. Reflexive activities, conversely, explore the why? behind such actions. For example, if an app is recommended to assist planning early literacy lessons the reflective portion would consider the more logistical aspects based on past experiences. Reflexivity would be the justification of its benefit for that context. This suggests levels of thinking about teaching and a process to capture these thoughts, according to the literature and embeds meaning behind one's actions (Dewey, 1913; Morrow, 2009).

Dewey's (1938, 2008) democracy is not converted into an instrument here but rather maintained as the foundation upon which teaching practices may shift in

Early Childhood Education and Development and Family and Consumer Sciences courses. Shifts were attributed to a professor's authentic learning and negotiation experiences during the process of exploring student iPads.

### **Teaching Texts and Factors**

Elements of classroom pedagogy are referred to as *texts*, a Bakhtinian frame of reference for teaching practices that impart a sense of flexibility necessary for negotiation. Texts are categorized into the five National Education Technology Standards for Teachers (NETS-T) factors for rigor and for applicability (ISTE, 2002). Applicability allows this research to be placed within other contexts to suit diverse learning environments. The NETS-T factors are *Facilitate Student Learning and Creativity, Develop Digital Age Learning Experiences & Assessments, Model Digital Age Work and Learning, Promote Digital Citizenship and Responsibility, and Engage in Professional Development and Leadership* (ISTE, 2002). These factors represent the standards ISTE (2002) developed for teachers to engage students and to improve learning with technology.

### **Dialogical Self Theory**

Mikhail Bakhtin (1973) was a philosopher who first introduced the Dialogical Self Theory (DST), the idea of shifting thoughts by way of juxtapositions or dialogically opposed positions on a topic. These oppositions occur within one's self, meaning a new thought on one's own preconceived notion, referred to as autodialogue. They can occur in opposition to others' thoughts and opinions or heterodialogue. His theory shed light on how a person entered a situation with one

thought or opinion but changed opinions if new arguments or experiences made better sense. Dewey (1916) supported the idea of juxtaposition when he wrote, “Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates invention. It shocks us out of sheep-like passivity, and sets us at noting and contriving...conflict is a sine qua non of reflection and ingenuity” (p. 300).

**Dialogic voice.** Although it may sound rather complicated, dialogic voice is a concept about how people interact in their everyday lives. Opinions and feelings are rooted in experiences that led a person to think as they do or to speak from that voice. When challenged by a new thought or some awakening to a new perspective, those opinions are challenged and potentially changed. This exchange of thoughts and opinions is the essence of dialogism.

In this study, dialogic voices, a precept of Bakhtin’s (1973) Dialogical Self Theory (DST), are professors’ thoughts reported in journals or captured in conversations about what, how, and why they employed certain teaching practices with and without iPads. Voice of self was a professor’s own assertion of a practice or opinion about student iPads. Voice of other was a statement made by another person that offered his or her thoughts or opinions on the topic at hand.

Aveling et al. (2014) devised a systematic approach to investigating dialogic voices. Their three-step process includes identifying self-talk, inner-talk, and relationships between the two, a system influenced by methodology in two ways. First, it exposes the concept of *voicedness* rooted in Bakhtin’s dialogism that supports an investigation into shifting thoughts (1981b). Second, a researcher does

not have to be a literacy expert or linguist to use this system in exploring voices that influence actions. This allows a complex process of thinking and exchange to be illuminated in a systematic way. Aveling et al.'s (2014) strategy of analyzing Bakhtinian's discourse isolated voices of self, voices of others, autodialogues, and heterodialogues by pulling out pieces of language that fall under those categories (Bakhtin, 1981b, p. 293-4). Statements that begin with "I," "me," "my," "our" are placed under voice of self. Statements that begin with "you," "his/hers," "they/them" or a specific person/entity are placed under the voice of others category. Statements that infer two differing thoughts from one individual are placed under autodialogue. Statements that suggest an individual's personal opinion or practice versus that of another person or institution is placed under heterodialogue. This research is based on shifting thoughts and practices within a community that influences teaching practices and student perceptions of their future professional practices using iPads with children and families. This is important because in globalized societies susceptible persons are exposed to technology, and professionals must be prepared to address these cultural artifacts in contextually and pedagogically sound ways.

**Dialogic relation.** In Shields' (2007) *Bakhtin Primer*, the researcher discusses dialogue as not merely words or talk but as a process of constructing meaning that orients individuals within their environments; it is ontological. Dialogic relation is a Bakhtinian term Shields (2007) has coined that inspires my methodological design to decipher between language that referred to traditional or iPad mediated teaching practices using dialogic relations (Shields, 2007). Voice 1

references language about traditional practices, while Voice 2 references language about technology-in-hand practices (tech-in-hand). Berson and Balyta (2004) write about this kind of transition, highlighting the negotiation among educators to determine the value added by technology for pedagogical purposes, particularly in social sciences (p. 67).

### **Culture of Innovation**

The purpose of this project is to connect professors' democratic experiences implementing student iPads to an emerging *culture of innovation* (Sharples, 2005). Sharples et al.'s (2007) sketch of cultures of innovation is maintained as "tool-mediated socio-cultural activities." If these activities influence classroom environments and/or student perceptions of technology for their professional agendas with children and families, they are understood to be indicators of an emergent culture of innovation (Engestrom, 1994; Sharples, 2005; Sharples et al., 2009). Sharples et al. (2009) recognizes the ubiquity of mobile devices and advocates for mobile technologies in education, asserting that "we have the opportunity to design learning differently: linking people in real and virtual worlds, creating learning communities between people on the move, providing expertise on demand and supporting a lifetime of learning" (p. 234). By virtue of propagation, culture is shaped, in part, by classroom experiences and actions these students may take in their future endeavors with children, students, and families.

## **Research Approach**

The contextual and heuristic nature of dialogism warrant qualitative measures that are ethnographic, empathetically neutral, and reflexive (Patton, 2002). These three perspectives provide a glimpse into the role of the researcher within the cultural context of this study.

### **Ethnography**

*Ethnographic* research relies on rich descriptions of contexts and ruminates cultures and climates in which research is conducted, intertwining it into the analysis (Chambers, 2000). The nested components of the university, college, department, faculty, and students contextualizes the environments in which this exploration of iPads occurs, accentuating the vision of the university and its constituents in developing an understanding of what teaching and learning looks like as they evolve newer practices teaching in a digital era.

### **Empathic Neutrality**

Empathic neutrality emphasizes the importance for me to be close enough to the phenomenon to understand the nuances in the data and the implications of the findings, while distant enough to avoid overtly clouded judgment (Patton, 2002, p. 50). As a student matriculating in the Family Sciences Department and as a graduate research assistant helping manage a previous study with faculty iPads, I have witnessed the growing presence of mobile technologies, influencing how I see pedagogy shifting. Having access to faculty struggles and successes has shown me that this is a process and not an event. With this in mind, I have gained better insight

in capturing this phenomenon by delving deeper into the thought processes of the professors and students, while maintaining objective notions about the iPad itself. This helped me isolate the democratic aspect rather than the technical aspect of shifting practices.

### **Reflection**

Researcher reflections of events were incorporated into the data, drawing upon my insights about classroom practices with the iPads. Patton (2002) states, “Reflexivity [...] entered the qualitative lexicon as a way of emphasizing the importance of self-awareness, cultural consciousness, and ownership of one’s perspective” (p. 64). My perspective and influence on the environments in which these events took place had to be qualified in some way; therefore, empathic neutrality applied to the analysis took this influence into account.

Keeping in line with this approach, ethnographic accounts including interviews, reflexive journals, and classroom observations sculpted the investigation to a creative synthesis of experiences and voices, capturing the process and meaning behind bottom up, democratic innovation tactics. It was to be seen if those experiences influenced Early Childhood Development and Education (ECDE) and Family and Consumer Sciences (FCS) students. To investigate any cultural shifts toward innovation, I questioned three student focus groups about *their* perspectives of texts that surfaced from their *professor’s* innovation experiences and teaching evolutions (Sharples, 2005; Sharples et al., 2007; Sharples et al., 2009). The importance of this research laid in cultural shifts toward technology-mediated

pedagogies, stemming from educators' own enterprise to remain viable resources to students of all ages in globalizing societies.

### **Site Description**

Ethnography is a culturally driven research approach, invested in the multifaceted nature of its participants and the complexity of their actions. To better understand how educators and students experienced innovation with iPads, accounting for the culture in which they co-existed is a fundamental avenue. These parts of the university are nested within each other, funneling down to more specialized areas of education each with their own history and culture.

### **University**

The cultural aspect that depicts TWU and has influenced this innovation process is epitomized in the democratic fashion in which iPad implementation has taken place. Three professors took the initiative to employ their own agency to establish and see this iPad implementation through, illustrating how TWU leadership views the agency of its faculty to accomplish such goals.

Historically, TWU has challenged the status quo by offering women equal opportunities to quality higher education and professional development, a tradition that has developed over time. In 1901, TWU was established and named Girls Industrial College (GIA); in 1905, the name changed to College of Industrial Arts (CIA). The university was built to provide women a liberal education, so they could integrate successfully into the industrial workforce. Another notable TWU cultural contribution occurred in 1917 when CIA established the first kindergarten within a

state college. This university that historically challenged the status quo has maintained its mission to advance its culture and provide the resources necessary to educate in a digital era.

Texas Woman's University, renamed again in 1957, supports research projects with mobile education technology that adheres to the Quality Enhancement Plan, *Learn by Doing*, initiated in 2013. This mission prioritizes student learning outcomes, "to effectively connect classroom theories to real-world experiences through practical application of knowledge" (Goals and student learning outcomes, 2016, May 9). This plan to provide students practical experiences to enhance their learning and future endeavors reflects TWU's original mission when established and is still visible today as 2.0 technologies permeate in personal and professional environments.

### **College**

Established in 1906, TWU's College of Professional Education (COPE) encompasses 14 reputable undergraduate programs. Leaders of COPE state their mission as "inspiring [students] to embrace creativity, diversity, leadership, and lifelong learning; and to establish avenues of community involvement through collaboration, accessibility, and service" (Our vision and mission statement, 2016). COPE fosters growth in its students by providing a holistic education for educators and human service practitioners. Majors within COPE, such as Teacher Education, Family Sciences, Reading Recovery, and Counseling, cater to professional aspirations to understand the social, emotional, physical, linguistic, and cognitive needs of others, highlighting the nature of this college to be focused on human agency and citizenship.

## **Department**

The Family Sciences (FS) Department is housed in the Human Development Building, along with the Academic Advising Center and Career Services. Family Sciences includes Counseling & Development, Early Childhood Education & Development, Women's Studies, Family and Consumer Sciences, Family Studies, and Family Therapy. The mission of the department "is to provide quality academic education in the scientific study of family, thereby stimulating students' intellectual curiosity; developing their research and leadership skills and their personal and civic responsibilities; and promoting diversity and respect for multiple family forms" (Our Mission, 2016).

As a graduate student in this department, I had the opportunity to become acquainted with the faculty and staff. From the onset of my coursework, I was welcomed into this department as a co-learner, gaining insight from my professors but also lending my own experiences with children and families to the discourse, as do all FS students. Support from the department afforded me opportunities to teach undergraduate Early Childhood courses as well as several research opportunities. These invaluable circumstances introduced me to teaching new populations of college students and pre-service teachers whom I had aspired to teach. The sense of accomplishment even prior to graduation has influenced my confidence and allowed me to excel. The FS Department encourages students to teach, to assist in research, and to participate in programs that expose them to practical professional experiences, which enhance their learning experiences at TWU.

## **Classrooms**

The classrooms in the Family Sciences Department seat approximately 30-40 students at one time. In the classrooms I observed that the iPad charging station cart that housed the student iPads was located alongside the desks, chairs, and podium. The cart itself had a presence in the room that hinted to the new ways in which learning was facilitated. Classrooms strewn with windows looked out to the courtyard where old and new buildings reside. Bookshelves were filled with textbooks and journals about child development and education. Tucked away in various corners of the building were toys, games, and art supplies for students to explore like children for professional purposes. The sense of respect for children and families of diverse dynamics was palpable. I often said that if someone walked into these classrooms not knowing what it meant to appreciate childhood, that individual certainly did not exit with the same notions, but one cannot misconstrue the warm feeling as related to a relaxed approach to education. Rather, the courses challenged students to introspect and to understand the theories that validate early childhood education and development and human services. By doing so, students developed their own paradigms that truly reflected who each student was as an educator, advocate, or specialist working with children, students, and families.

Overall, the focus of these component programs is on developing students as viable resources for others. Considering the presence of technology within each of the fields in COPE and with the QEP goals set to propel such missions, research-based approaches introducing mobile technology into their programs have become

imperative. The next stages of iPad implementation in the Family Sciences Department is a “smart classroom” that will be interactive, allowing faculty and students to share images and content mediated by the iPads with their peers, a sign of learning in digital times.

### **Research Questions**

Three aspects were considered in this investigation of the influence of innovation on culture: the tactics used, professors’ teaching practices with and without technology, and student learning experiences with the technology that transferred to their own pedagogies. In essence, this was viewed as a propagation of iPad considerations.

First, it was important to elicit what the professors experienced during the innovation process and to determine if they were in line with the literature. It was also important to determine if my NETS-T categorization system coalesced with teaching practices to provide credibility and transferability in other educational contexts (ISTE, 2002). Second, with respect to the theoretical framework premised on the dialogical self, exploring how teaching practices may have evolved through communication during their innovation process was a key to substantiate democratic tactics for implementing student iPads. Third, inquiring if student experiences and opinions about teaching practices with iPads had any influence on considerations for their professional milieus intended to qualify the tactics and voices that manifested them. These considerations can be viewed thusly as agents for cultural shifts toward students’ future technology mediated practices with

children, students, and families. Dewey (1916) was extremely prophetic with his position on purposeful education for practical applications, stating:

As societies become more complex in structure and resources, the need of formal or intentional teaching and learning increases. As formal teaching and training grow in extent, there is the danger of creating an undesirable split between the experience gained in more direct associations and what is acquired in school. This danger was never greater than at the present time on account of the rapid growth in the last few centuries of knowledge and technical modes of skill (p. 11).

With this philosophical and cultural backdrop to the investigation in place, the overarching question remained: What democratic experiences among professors took place and how did these experiences influence teaching and learning in the eyes of matriculating professional educators and human service practitioners? To develop this overarching question into a concise methodology for eliciting some answers, these three questions drove the inquiry:

Research Question One: What did educators experience during the process of exploring student iPads, and how did that evolve teaching practices in their Early Childhood Development and Education and Family and Consumer Sciences courses?

Research Question Two: How did educators' dialogic experiences exploring the use of student iPads for Early Childhood Development and Education and Family and Consumer Sciences courses influence the process of integrating iPads into their teaching?

Research Question Three: What impressions do students enrolled in Early Childhood Development And Education (ECDE) and Family and Consumer Sciences (FCS) courses have about teaching practices with newly acquired student iPads, and do they reflect a culture of innovation?

### **Participants**

The participants in this study were instructors and students at Texas Woman's University (TWU) in the Family Sciences Department. This was a purposive sample of three professors who had adopted technology voluntarily and agreed to use student iPads in their courses beginning Spring 2015. They formed a group among themselves in a grounded theory research project of their own initiative. Additionally, they desired a 360° view of this phenomenon and, thus, invited a research study around their experiences. This was an opportunity to observe a truly democratic innovation process from the bottom up and from an outside perspective to develop ethnographic descriptions that added contextual elements necessary for holistic investigations of intrinsically driven enterprises. This theoretical and purposive sampling strategy was suited to address the purpose and qualitative analytical framework of this research, determining the connection between democratic tactics and subsequent teaching practices or texts that surfaced in reflexive activities about new tech-in-hand classroom dynamics (Berson & Balyta, 2004; Schwandt, 2007, p. 269).

## **Professor A**

Participant Professor A is a tenured faculty member of the Early Childhood Development and Education department at TWU since 1996. She has spearheaded and/or advised on several innovation programs at TWU and received Distinction in E-Learning Award in 2009. From a cultural standpoint, she is well known in the community as a technology leader whom many other faculty members seek council for technical and pedagogical advice. Her research interests include “the influence of emerging technologies on the growth and development of the young child, home/school/community relationships as influenced by technological advances, and distance teaching methodologies” (Research Interests, 2016).

Professor A has been my graduate advisor and my instructor in seven courses during my time at TWU. I recall an initial sense of nervousness as I reviewed her syllabi that were strewn with technology mediated activities. As a neophyte technology user, I felt that this would truly challenge me as a student, but I was intrigued about what I could learn that would develop my professional skills under her tutelage. Further, I was curious about how to integrate technology into early childhood development and education courses since I was occasionally teaching them.

Professor A had three main philosophical beliefs that were evident in her classes. The first was that theory was crucial to understanding how children grow and learn. The second was respect for children and families that are all diverse and contextually situated in their unique ecosystems. Finally, she asserted that

technology was a tool for making learning visible, advocating for activities that develop digital citizenship among all constituents of the classroom, including children. Professor A's role in this study embraced being an exploring instructor, learner of new technology infrastructures, collaborator, pedagogical mentor, hostess of all debriefing meetings, and advocate for advancing the technology in the Family Sciences Department.

### **Professor B**

Participant Professor B is a lecturer in the Family Studies/Family and Consumer Sciences departments at TWU since 2009. Her research interests include “technology, Family and Consumer Science teacher preparation and integration of technology in FCS classrooms, increasing student engagement in online and blended learning environments” (Research Interests, 2016). Professor B's doctoral dissertation was on educator experiences in Second Life, online virtual spaces, and she continuously seeks insight into various digital platforms, extending her learning outside of the TWU culture (Dutton, 2009). Also, she spearheads technology talks in the Family Sciences Department that demonstrate various platforms, how to navigate apps, both iPad and web based, and she has an extensive background in Information Technology (IT).

Although Professor B is well versed with mobile technologies much of the time, she quietly observed the interactions of her two colleagues, being slightly less outspoken but very generous with iPad ideas, particularly in the area of gamification strategies. Gamification employs basic elements of games, such as point systems and

applies them in other contexts such as classroom activities and student assessments. Professor B used 3D GameLab throughout her course, which gamified the content and calculated student scores based on completion of “quests” or summative and formative lessons conducted through the web based application.

I was never enrolled in Professor B’s courses, but my observations of two of her courses shed light on her as an instructor as well as elements of her paradigm. She was very flexible and encouraged students to be creative, and to build on their interests and skills to demonstrate their learning. She frequently referenced using what students created in class for practical applications in their professional fields working with families. This includes demographic surveying and financial considerations for assisting families with housing or building websites as well as electronic portfolios to represent their academic and professional achievements. It is important to take inventory of these types of activities because it provides a better sense of her as an instructor and technology ideal leader.

### **Professor C**

Participant Professor C is an assistant professor in the Early Childhood Development and Education department at TWU since 2014. Her research interests include “children’s play, technology and play, technology and children’s literature” (Research Interests, 2016). She has a background in music, with 16-years of teaching experience in elementary schools and two years in as a librarian. Professor C’s doctoral dissertation is premised on children’s play with interactive tablet technologies. Professor C’s teaching practices with iPads and applications are visibly

strewn throughout her course with particular content, which is supported by iPad applications. She leads with much of the infrastructure building, including the iPad configurator that allows her to deploy changes from one main computer to all 40 student iPads, including settings, apps, screensavers, and data particular to student needs and learning objectives.

Professor C's paradigm of educating young children is very visible. Play is a major component of both courses I observed, which she has incorporated into many class sessions. Her verbiage reflects the intention for her students to explore as young children do so as to develop a better understanding of purposeful choices when designing environments and activities. She is flexible with how students present their work and allows students to engage in activities they have chosen by providing centers similar to early childhood classrooms. Professor C always makes iPads optional and part of the choice element in the centers. She downloads the majority of the iPad applications for students to explore and explains the benefits of such applications for enhancing hands-on learning experiences for children. The final piece is her application of the Texas Essential Knowledge and Skills (TEKS) in her Foundations courses, which are standards students will have to adhere to if they choose to be Texas educators, lending a very practical layer to her instruction.

### **Student Participants**

The student aspect of this study takes into consideration the context and nature of their professional goals as future educators, child advocates, and family and consumer science specialists. Many of these students go on to become physical

or occupational therapists, child and/or parent educators, college or university teachers, interventionists, child advocates, or specialists in the field of housing, nutrition, or consumer sciences. There is a very wide range of ages, and only a few male students are enrolled in the four courses I have observed. Students are mixed in their digital fluency, lending to the collaborative efforts among them when exploring various apps and platforms. Students arrive to class in a casual manner, set up their work, including assigned iPads, in their preferred seats, and engage in both social and academic fashions. The criteria for inclusion are enrollment in one of the three courses taught with iPads and at least 18-years of age. This is a purposive sample, and the experiences with iPads shared by this sample of students qualify them as representing the classroom culture (Anfara & Mertz, 2006).

### **Participant Summary**

It is pertinent to include more narrative explanations of faculty research interests and contributions to the group dynamic to provide rich descriptions of their pedagogy. Taking inventory of the students contextualizes the overall picture of the classes in which the iPad explorations have taken place.

This portion of my methodology is essential because it better appropriates technology agendas and teaching practice choices of each professor, cumulatively depicting them from the vantage point of technology adoption. Adopters refer to those who continuously explore technology options and employ new findings into their repertoire of actions (Afshari et al., 2009; Dawson, 2007; Efaw, 2005; Herrington et al., 2014; Hineman et al., 2015; Hogue, 2012; Kukulska-Hulme, 2012;

Lefoe et al., 2009; Ouzts & Palombo, 2004; Sharples et al., 2007). Examples of this are seen in Professor A, B, and C's initial proposal to acquire the student iPads, exhaustive exploration for new and improved platforms for students to learn and make learning visible, and the proposed "smart room" that is the next phase of their innovation plan for the Family Sciences Department. All of these elements are integral to ethnographic research that calls for deeper explanations and connections to influential factors within the cultures they reside (Patton, 2002).

### **Role of the Researcher**

In this section, it is important to explain my role as the researcher in a way that shows my inspiration behind this research topic and methodology (Patton, 2002; Saldana, 2009). Currently I am a doctoral student at Texas Woman's University (TWU) and have been assisting with research on iPad implementations in the College of Professional Education (COPE) since 2012. In 2015, I conducted a pilot study on the newly acquired student iPads, taking inventory of classroom practices and initial professor thoughts on teaching and learning goals in light of this new pedagogical tool. Later on that same year, my advisor invited me to spearhead this research, observing bottom up innovation with student iPads, as an extension of previous research with faculty iPad implementations (Jackson et al., 2013).

### **Data Collector**

In this study, I had three roles. The first role was data collector. I was the sole investigator scheduling, designing protocols, conducting interviews, observing

classrooms and debriefing sessions, and meeting with focus groups. This particular role allowed me to employ my own paradigm of teaching and learning that is heavily influenced by inductive reasoning and social-constructivist ideals, and is situated within ecological systems (Bronfenbrenner, 1979; Vygotsky, 1978). In reference to technology exploration with future child educators and advocates, it is imperative to develop one's own paradigm, so activities with technology are purposeful and meaningful; thus, my endeavor to examine how meaning can evolve is rooted in democracy.

### **Reflexive Participant**

The second role was *reflexive participant*, incorporating my reflections of classroom observations and debriefing sessions into the corpus of data sources (Dewey, 2008; Patton, 2002). They provided a means for confirmability of teaching practices reported by educators and contextualizing classroom activities with student focus groups.

### **Empathic Neutrality**

Being a reflexive participant segues to my third role as a member of the TWU culture that provided the empathic neutrality necessary for more accurate interpretations of the qualitative data. Collectively, these three roles allowed me to have a natural presence in the various settings in which this research was conducted as well as accounted for my influence upon the environment (Patton, 2002). The symbiosis of the researcher's relationship and the environment, including participants, was integral to this ethnographic research (Anfara & Mertz,

2006; Moustakas, 1994; Patton, 2002). Further, it offered a “relative rationalization of conceptual meaning, deepened with the help of philosophical interpretation that is integral to dialogism” (Bakhtin, 1986b, p. 160).

### **Setting and Data Sources**

There were multiple data sources employed for this ethnographic study: observations, weekly, debriefing sessions, interviews, reflexive journals, researcher reflections, artifacts, focus groups, and tally sheets. Data collection occurred within the Family Sciences Department or online via email. Table 2 details this information with a richer description of the settings for applicability and truth-value purposes.

Table 2

#### *Data Sources and Settings for Collection*

<b>Data Sources</b>	<b>Settings of the Data Collection</b>
21 Classroom Observations	In two ECDE classrooms, one FCS classroom, in Human Development Building (HDB)
14 weekly, 1-hour Debriefing Sessions	Faculty office in HDB
2 Interviews	Faculty offices in HDB
5 Professors Reflexive Journals	Face-to-face in HDB, or via email
11 Researcher Reflections	In two ECDE classrooms, one FCS classroom
Artifacts	Classroom photos, syllabi, iPad screenshots, classroom handouts
3 Focus Group Discussions	In two ECDE classrooms, one FCS classroom
Focus Group Tally Sheets	In two ECDE classrooms, one FCS classroom

For a theoretical framework designed around dialogism, these data were instrumental for investigating dialogism behind action and subsequent student opinions of the influence of this phenomenon on classroom culture (Patton, 2002; Schwandt, 2007). As with any qualitative research, researcher interpretations during analysis can skew findings from any theoretical “center”; therefore, the degree of verisimilitude varies from study to study (Popper, 2002; Schwandt, 2007).

There were seven categories of data used in this project. Each research question addressed different aspects of the purpose of this research (educators’ experiences, negotiations of iPad activities, and influence on students); therefore, I utilized multiple sources and means for triangulation as outlined in the analysis section.

### **Archival Data**

An IRB approved pilot study (Appendix A) conducted prior to this dissertation research during the Spring 2015 semester produced three sources that were included in the corpus of data: initial interviews (Appendix B), classroom observations (Appendix C), and educator reflexive journals (Appendix D). These three data sources provided data from the onset of the innovation process that were considered valuable for ethnographic synthesis because they illustrated the thoughts and opinions of iPad usage at the onset of the innovation endeavor among the three professors (Anfara & Mertz, 2006; Patton, 2002). Further, they allowed me to see how the iPads were contextualized by the course content since they differed from the courses observed in *this* study. In the pilot study, Professor A taught the

same Foundations course; Professor B taught Occupational Issues in Family Sciences; and Professor C taught Creative Arts & Literature for Young Children.

### **Classroom Observations**

Each of the classes that explored student iPads was observed a minimum of six times for the duration of the class period, two of which were archived observations (Appendix C). Various classroom activities, discussions, and visuals with time-stamps were recorded and saved in a password protected Google Drive. Additional information of each observation included class size, class arrangement, and number of students using the iPads versus not using the iPads assigned individually for their use (devised by the three innovation group members). A system of *note taking* described what I objectively observed, and *note making* categorized observation notes into themes (Sharples, 2005; Sharples et al., 2007; Sharples et al., 2009). These three elements are what Sharples et al. (2007) regards as making-meaning out of raw data, allowing me to take objective notes and to make sense of them in context (p. 11).

### **Debriefing Sessions**

The three professors arranged weekly debriefing sessions in a faculty office to discuss various aspects of the iPads (Appendix E). I sat in on these discussions with an audio recorder and took notes, such as iPad applications, barriers, organization, classroom activities, student engagement, and so forth. This was the main source for collecting data on heterodialogue, the dialogic voices between one's self and others to situate actions taken.

## **Interviews**

Professors were interviewed individually twice. For the pilot study, an initial interview was conducted at the onset of the project in a face-to-face meeting in their offices (Appendix B). I constructed questions to be open-ended and inquired about common teaching practices in traditional dynamics, including assessment strategies, engagement tactics, grouping, and so forth. These teaching practices are referred to in this study as “texts”, a Bakhtinian inspired term relating dialogism to education discourse, such as “I hope to teach my students...” or “Students need to understand theory because...” (Bakhtin, 1981a; Shields, 2007). This data provided information about teaching practices in traditional dynamics prior to full iPad integration that was part of the dialogic discourse analysis (Aveling et al., 2014).

I conducted a second interview (Appendix F) that followed up the initial interview, inquiring about educators’ experiences of democracy during their innovation process using the iPad and any subsequent shifts in teaching practices that did incorporate student iPads. These areas of teaching were then categorized into the NETS-T factors to streamline the areas and made them more applicable to other teaching contexts (ISTE, 2002). Table 3 lists the NETS-T factors and gives examples of texts that fell under that factor.

Table 3

*Factors and Samples*

<b>Factor</b>	<b>Sample Text</b>
Factor One: Facilitate Student Learning and Creativity	Design a digital representation of safe environments for children
Factor Two: Develop Digital Age Learning and Assessments	Use apps to support TEKS standards
Factor Three: Model Digital Age Work and Learning	Using iPads to find resources for children
Factor Four: Promote Digital Citizenship and Responsibility	Review FERPA laws with iPads
Factor Five: Engage in Professional Growth and Leadership	Practice using child friendly apps

This data provided evidence of the praxis of the educator that potentially evolved the Voice 2 that reflected teaching practices *with* technology, visible in the dialogic discourse analysis (Aveling et al., 2014; Schwandt, 2007).

**Reflexive Journals**

During the pilot study phase, the professors responded to five reflection prompts related to the five NETS-T factors. These included descriptions of the factors to provide a focal point in their responses (Appendix D). Each prompt had between two and four parts that related to the same factor to acquire deeper detail of their teaching practices. In keeping with the reflexive nature of this research, it was pertinent to delve into the autodialogue as it pertained to their teaching, innovating, and participation (Baran, 2014; Bennett et al., 2012; Dewey, 1904, 1933;

Efaw, 2005; Herrington et al., 2014; Herro, Kiger, & Owens, 2013; Rodger, 2002; Sharples et al., 2007). By doing so, the heteroglossia or multivoicedness of the individual on a topic that evolved as the praxis of their teaching evolved could be analytically linked to dialogic relations, which are traditional vs. technology mediated teaching practices (Bakhtin, 1981a, 1981b; Shields, 2007).

### **Student Focus Group Open Discussions and Prompts**

The data from student focus groups were audiovisual recordings of open discussions on campus. Discussions were about experiences with the iPads over the Fall 2015 semester, influences on their thoughts about technology mediated pedagogy, and how their experiences enhanced or hindered their understanding of teaching and advocating for children and families with technology-in-hand. There was one focus group per class using the iPads, with a total of three independent focus group gatherings. Questions were based on preliminary findings from the triangulation of educator's second interview, reflexive journals, and early debriefing sessions, generated by the NVIVO program (Appendix G). To accomplish this, I coded transcripts from each of these data sources by the democratic tactic nodes, or themes, as well as the texts/factors nodes. I queried the data within NVIVO to pull out all cross-references meaning all connections between those two nodes. A table with all instances of cross-references appears with the option of pulling out

the transcript pieces that qualify that cross-reference. Here is a hypothetical

example:

1) Transcript sample: Professor X: "I was interested in learning about math apps so I could show my class how to use them with children."

2) Code this statement into three nodes, Learner-Centered democratic tactic, curriculum planning text, and factor 3 Digital Age Work and Learning.

3) Continue coding in this fashion, and then run a Coding Matrix Query, using only the data sources appropriate for this particular portion of the analysis, connecting democratic nodes to texts/factors nodes.

4) The table that is generated represents the number of cross-references of those specific nodes.

5) Synthesize the connections to develop questions for students, using observation notes to situate and contextualize if necessary.

6) Sample question: *The data reflects a strong association with your professor's collaborative experiences and intentions for collaboration to be part of her course, and her attempts to model digital age work and learning. This was observed in classes that grouped you to work on your classroom environments projects. Would you agree or disagree that these activities helped you in building a classroom culture, or community? What are your suggestions to improve in the area of collaboration to build community with your peers or professors using the iPads?*

Questions to the group were posed in open forum format (Moustakas, 1994; Patton, 2002). I first inquired if students agree or disagree with the reports on teaching practices, such as the presence of learner-centered activities or opportunities to reflect on learning. With a show of hands, students indicated if they felt that the activity was innovative, not innovative, or neutral; answers were respectively recorded in a tally sheet. At the end of each section, students openly

discussed their thoughts on classroom activities related to that tactic. This is also an opportunity to offer recommendations for improvement in future Early Childhood and Family Science courses and/or critique the iPad itself. These data provide the final piece of the research connecting democratic tactics to student opinions. An emerging culture of innovation is implied in the suggestions they provide to help better incorporate iPads into their future careers as educators, advocates, or specialists in the field of Family and Consumer Sciences.

### **Researcher Reflections**

Researcher reflections of classroom observations and educators' debriefing sessions described empathic neutrality, opportunities to purposefully reflect on *my* influence on the innovation process and impressions of teaching practices and visible goals with student iPads (Appendix I). Additionally, these reflections served to confirm teaching practices and classroom activities reported in the second interview from which questions for the focus groups are derived. Patton (2002) states, "Qualitative methodologists question the necessity and utility of distance and detachment, asserting that without empathy and sympathetic introspection derived from personal encounters, the observer cannot fully understand human behavior" (p. 49). Researcher reflections also assume hermeneutic contextualism that either corroborate or dispute the data, creating a preface for deeper inquiry or lingering questions to be explored. Horowitz (2006) argues that "hermeneutic contextualism provides the best account of the linguistic examples under discussion; in particular,

it provides the best solution to contemporary puzzles concerning the truth-conditions of [statements] involving the knowledge predicate 'know'"(p. 2).

### **Recording the Data**

Recording devices were used with various data sources to capture qualitative data and transcribe with a higher degree of accuracy (Patton, 2002). I used an audio recording device in interviews, debriefing sessions, and reflections conducted in interview fashion. I used an audiovisual recorder in the focus group gatherings due to the number of students speaking and the need to identify changing speakers. Hoepfl (1997) advises researchers to use recordings because they have the advantage of "capturing data more faithfully than hurriedly written notes might, and can make it easier for the researcher to focus on the interview" (Interviews section, para. 3).

Reflections submitted via email, emails, researcher observation notes, and researcher reflections were copied and pasted or created within Google Drive, a password protected web-based application that affords both writing and storing data. All data were ultimately imported and stored in NVIVO, a computer assisted qualitative data analysis system to add rigor and allow me to manage immense amounts of data (CAQDAS) (Johnston, 2006).

### **Timeline (Phases I-III)**

#### **Phase I**

Archival data were collected from the pilot study for this research. This includes Interview 1, the first two of six classroom observations of each professor

(total of six), researcher reflections of those observations, and the educators' reflexive journals collected via e-mail (copied and pasted in NVIVO) or in face-to-face interview format (recorded and transcribed and imported into NVIVO) (Appendices B, C, D, I).

## **Phase II**

This was the time period of intensive data collection. It included Interview 2, weekly debriefing sessions, weekly classroom observations, and researcher reflections (Appendices C, E, F, I). Once data were collected, transcribed, and preliminarily analyzed, reports on Voice 2 texts were synthesized to compose focus group prompts. This allowed students to report attitudes about teaching practices and opinions about an emerging culture of innovation through their experiences during the semester with iPads.

## **Phase III**

This was the period during which the three focus group gatherings and triangulation of all collected data took place. Findings were placed within the context of the research questions, with discussions and implications. At the closing of this phase, participants were invited to a debriefing session to discuss the research and findings if they chose to do so.

Table 4

*Timeline*

<b>Date</b>	<b>Population</b>	<b>Item</b>	<b>Frequency</b>
January 2015	Researcher	Pilot Study IRB	n/a
Spring 2015 (February-April)	Educator-participants Researcher	Pilot study	n/a
August 2015	Researcher	Research IRB	n/a
August 2015	Students	Recruiting and Consent	1 each
February	Educator-participants	Interview 1	1 each
October 2015	Educator-participants	Interview 2	1 each
February – April 2015	Educator-participants	Reflections	5 each
February – October 2015	Educator-participants Researcher	Classroom Observations Notes and Reflection	6 or more each
April – October 2015	Educator-participants Researcher	Debriefing Sessions Notes and Reflection	6
February – October 2015	Educator-participants	E-mails	Continuous for 6 months
September – October 2015	Students and Researcher	Focus Group assignments	1 x 3 groups
October 2015	Students Researcher	Focus Group Discussion Observation Notes, Tally Sheet, Debriefing	1 x 3 groups
December 2015- January 2016	Researcher	Analysis	n/a
January-May 2016	Researcher	Share findings with participants	Unlimited until May 2016

## **Data Analysis**

I collected various types of data, used multiple data collections methods, and analyzed data with the qualitative analysis program NVIVO to provide a rigorous analysis methodology to this qualitative inquiry. I member-checked data and findings with both students and professors to provide trustworthiness and truth-value, respectively, a deep understanding of the nature of the inquiry and data.

### **Triangulation and Coding with NVIVO**

A Computer Assisted Qualitative Data Analysis System (CAQDAS), NVIVO, was used to store all external and internal data for triangulation purposes as well as to search, query, and visualize data for discourse analysis. NVIVO has the capacity to import data, create a priori and a posteriori categories by assigning data to predetermined nodes or themes, make connections, create new nodes, and justify findings to add rigor and reliability to my methods (Edhlund & McDougall, 2013). Miles and Huberman (1984) confirm that the use of a priori in qualitative research qualifies the researcher's role in the inquiry as having a conceptual framework in mind from the initiation phase upon which to design methods appropriate to that inquiry. The layers of coding I determined suited each of the research questions given the nature of this inquiry to be the influence of democratic tactics on teaching practices and student opinions. Strauss and Corbin (1990) explain that the purposes of coding are to describe phenomena and to create new understandings of the phenomenon being studied. Although the a priori was set, there remained flexibility in the research design to incorporate emerging themes that came out of the data and

preliminary analyses. Table 5 provides a recipe of this methodology detailing this process.

Table 5

*Data Sources and Analysis Methods*

<b>Raw Data</b>	<b>NVIVO</b>	<b>Analysis I NVIVO: Coding Matrix</b>	<b>Analysis II NVIVO: Coding Matrix</b>	<b>Analysis III NVIVO: Coding Matrix Word Frequency Cluster Analysis</b>
<p><u>Audio files:</u> -Debriefings -Interviews 1 &amp; 2 -Reflexive Journals</p> <p><u>Video files:</u> -Focus Groups</p> <p><u>Notes:</u> -Observations -Researcher reflections</p> <p><u>Artifacts</u> -Photos -Screen shots</p>	<p><u>Import</u> all raw and transcribed data into NVIVO.</p> <p><u>Categorize type</u> of data source (interview, debriefing, audio file, etc.)</p> <p><u>Create Nodes</u> -Democratic tactics (layer one) -Texts/Factors (layer two) -Dialogic voice (layer three) -Dialogic relation (layer four) -Culture of innovation (layer five) -Suggestions (layer six)</p>	<p><u>Research Question One</u></p> <p><u>CODE SOURCES:</u> -Interview 2 -Debriefings -Reflexive Journals -Observations -Observation researcher reflections</p> <p><u>INTO NODES:</u> -Democratic Tactics (layer one) -Texts/Factors (layer two)</p> <p>INTERPRET FINDINGS -Empathic neutrality -Hermeneutic contextualism</p> <p><u>Create</u> focus group prompts based on findings of each educator.</p>	<p><u>Research Question Two</u></p> <p><u>CODE SOURCES:</u> -Interview 1 -Interview 2 -Debriefings -Reflexive journals</p> <p><u>INTO NODES:</u> -Dialogic voice (layer three) -Dialogic relation (layer four)</p> <p>INTERPRET FINDINGS -Empathic neutrality -Hermeneutic contextualism</p>	<p><u>Research Question Three</u></p> <p><u>CODE SOURCES:</u> Focus group Discussions (tally sheet to verify interpretations)</p> <p><u>INTO NODES:</u> -Texts/Factors (layer two) -Culture of innovation (innovativeness) (layer five) -Suggestions (layer six)</p> <p>INTERPRET FINDINGS -Empathic neutrality -Hermeneutic contextualism -Observations to contextualize prompts created from Analysis I.</p>

**Raw data.** Interviews, debriefing sessions, and reflexive journal audio-files were transcribed and imported into NVIVO. Observations, observation reflections, and educators' reflexive journals were copied and pasted or transcribed and imported into NVIVO. A master data chart was used to maintain the structure of the data to further enforce rigor and trustworthiness of the data. Each data source was categorized by type then labeled with the participant code, type of data source, and date. For example: FR\_TR\_int2\_A\_150101 indicates (Field Record) (Transcription) (interview 2) (professor code)(year/month/day). This allows data to be stored in chronological order identifying data for cross-referencing purposes while maintaining anonymity of participants.

**Coding.** The next step in NVIVO is to create nodes, synonymous to themes. Themes are based on the research questions using democratic, dialogical, and culture of innovation theoretical lenses. In this research there are six layers of nodes that are strategically applied as they relate to each research question. Patton (2002) explains that researchers must use "strategic ideals that provide a direction and a framework for developing specific designs and concrete data collection tactics" (p. 59). Patton (2002) added that these characteristics should be "interconnected" (p. 40), and Lincoln and Guba (1981) suggest that these components be "mutually reinforcing" (p. 39). The sequential design of these nodes guides the research down a logical path beginning with democratic experiences of professors and ending with student impressions and suggestions to enhance their learning.

**Analysis.** The final step is to create advanced coding queries such as *Matrix Coding*, *Cluster Analyses*, and *Word Frequencies* to turn data analysis into a cohesive narrative with visuals including graphs and word clouds (Woods, Paulus, Atkins, & Macklin, 2015). These were saved as new data sources and interpreted for preliminary findings of Research Questions 1, 2, and 3.

### **Node Categories in NVIVO**

Each research question warrants a unique combination of coding nodes to appropriately address each research question. Below are the specific node categories that explain what each node means, essentially scaffolding the research design and providing transparency in my thinking and coding strategy.

**Layer one: Democratic tactics.** From the perspective of Dewey's (2008) democracy, I placed salient statements from the interviews, debriefings, reflexive journals, observations, and researcher reflections into one or more of the six democratic tactic nodes: The *Democratic Tactics* node listed five types of democratic experiences that are embedded in the innovation process. *Ownership* node is the first tactic substantiated in the literature that refers to the ability to manipulate the iPads in both digital spaces as well as the device itself (appearances, downloads, uses). *Contexts* are actions taken or intentions specific to course content, learning objectives, or audience. *Learner-centered* node refers to professors' personal and professional attitudes, behaviors, and/or beliefs about iPads.

*Collaboration/Community* node is the joint enterprise or group project pursuit of professors to innovate with the iPads including the exchange of ideas, thoughts,

and feelings about iPad and application capabilities. The node *Mentor* refers to insight gained from one another that influenced pedagogy or technical skill, both among the professors and students, in the form of giving mentoring, being mentored, or desiring mentoring. *Reflection* node has two elements: *reflective* and *reflexive* activities. Reflective indicates recollection of previous experiences influencing future actions, such as a teaching practice done in the past being reconsidered for future courses. Reflexive refers to the reason behind such decisions, such as change of course objectives, different student demographics, or possibly a more developed understanding of an iPad function. I determined the appropriate node(s) based on the context of the narrative pieces or activities I witnessed by using hermeneutic contextualism, which are context-specific interpretations.

**Layer two: Innovation texts/NETS-T factors.** From the perspective of teaching practices, salient statements were placed into one or more of the 10 texts and 5 factors nodes. As I looked at the data, specific activities fell into texts, while more general teaching objectives constituted the factor node(s).

**Texts.** Texts nodes are determined in two ways. The first is from the literature on best practices in early childhood education; the second is from my 10 years of teaching experience in the classroom. These are intentionally conceptualized as befitting iPads meaning only the teaching practices that are conceivable for a university classroom with iPads are considered.

**Factors.** The NETS-T factors were designed as technology standards for K-12 teachers by the International Society for Technology in Education (ISTE) (2002) to provide guidance for engaging students and improving learning environments in ways geared for success in a digital era. By categorizing texts, democratic methods for innovating with student iPads can be executed by diverse populations because factor categories are not as specific as texts. Furthermore, use of progressive technology standards is a credible start to iPad implementations (ISTE, 2002). I explored connections of democratic experiences to texts *and* factors as they emerged from the data to determine the degree to which texts corroborated with factors and to substantiate this categorization system empirically (Analysis I). A coding matrix was created in NVIVO to account for all cross-references that occurred between the nodes. Table 6 and Table 7 provide brief descriptions of both texts and NETS-T factors.

Table 6

*Definition of Texts*

<b>Texts</b>	<b>Node</b>	<b>Definition</b>
<i>Classroom activity evaluation</i>	T1	Success or failures of a class activity
<i>Student output evaluation</i>	T2	Student work evaluation/assessment
<i>Curriculum planning</i>	T3	Plans for a course or class activity
<i>Learner-centered activities</i>	T4	Activities that allow student choice or preferences
<i>Multi-modal resourcing</i>	T5	Utilizing multiple resources for learning
<i>Reflection</i>	T6	Student reflections about learning or iPad use
<i>Community/culture</i>	T7	Building community or culture in the classroom

<i>Management</i>	T8	Systematic organization of class activities; managing time among all me; iPad maintenance; group work; class schedules; rubrics; expectations
<i>Classroom rules</i>	T9	Practices in a class that maintain respect and cohesion among all participants
<i>Differentiation</i>	T10	Adjusting teaching and/or learning practices or expectations to meet the needs of individual students

Table 7

*Definition of NETS-T Factors*

<b>Factors</b>	<b>Node</b>	<b>Definition</b>
<i>Facilitate and Inspire Student Learning and Creativity</i>	F1	Activities that require design or creative thinking
<i>Develop Digital-Age Learning &amp; Assessment</i>	F2	Activities that incorporate an assessment component either for the students or for children/families in future careers
<i>Model Digital-Age Work and Learning</i>	F3	Individual or group activities that incorporate technology; developing digital fluency; technology terminologies; online correspondence; exploring apps for children; addressing technical difficulties
<i>Promote Digital Citizenship &amp; Responsibility</i>	F4	Activities or discussions about cyber security and student protection; appropriate behaviors online; iPad maintenance; expectations with the device or online
<i>Engage in Professional Growth &amp; Leadership</i>	F5	Activities or discussions that improve student's professional skills and knowledge particular to course and career goals

**Layer three: Dialogic voices.** Dialogic voices represent two or more opposing thoughts within a single conversation that one has with him or herself or with others on any given topic. Each of these positions is a “voice” (Bakhtin, 1973; Shields, 2007). To come to a decision one determines from those voices what makes sense and what fits the situation better. This *juxtaposition* is the fundamental precept of dialogism (Bakhtin, 1973). In the context of this research, dialogic voices

encompass differing perspectives of professors about student iPads and iPad applications for teaching future educators, advocates, and child/family specialists.

***Voice of self.*** Using Aveling et al.'s (2014) method of Bakhtinian discourse analysis specific elements of verbiage were coded according to the voice of the speaker. Salient statements in first person were coded as *voice of self*. This includes speaking in first person representing a group, such as “we” or “our.”

***Voice of self and autodialogue.*** If there were opposing thoughts within the statement, it was coded as *voice of self* and *autodialogue*. An example of this is in this hypothetical scenario: ***We have been discussing using iPads to explore math applications for young children, but I think I want to use them to explore creative arts activities instead.*** This may prompt a professor to adjust her classroom planning to incorporate exploration of more creative art apps and influence her pedagogy.

***Voice of self and heterodialogue.*** If a first-person statement was attached to the thoughts or opinions of another, such as another professor, student(s), or the department, for example, it was coded as *voice of self* and *heterodialogue*. Here is a hypothetical scenario: ***We discussed how to use iPads for tracking children's work but they stated that their schools do not have iPads.*** This may prompt a professor to find alternative resources for students who do not have access to iPads in their professional environments; thus, a decision made from this dialogic exchange that influences her pedagogy qualifies as heterodialogue.

***Voice of others.*** Salient statements in a second-person narrative were coded as *voice of others*. This hypothetical scenario exemplifies the dialogic voice node

category: ***My students*** wanted to explore gamification platforms to use with 1st graders, like the ones ***you use, so they*** spent time exploring some last week. This may prompt a professor to section off a portion of class time to explore platforms, thus influencing her classroom management and pedagogy.

***Voice of others: Quotes and echoes.*** Voice of others also includes third-person narratives such as reciting direct and indirect quotes of others. An example of this is: *The **IT person told me, "You might consider using the configurator when Apple recommends updates."*** This is considered salient because it would impact how and when professors managed the iPads. Echoes in third-person narratives are similar to indirect quotes but reference a broader source such as "Research says..." or "Students believe..." These also qualify as the voice of others node.

**Layer four: Dialogic relations.** Context of statements made by professors were coded in one of two dialogic relations nodes: Voice 1, which is related to traditional practices and activities, or Voice 2, which is related to technology mediated practices and activities. This node reflects what the statement was in relation to, thus, the term dialogic relations. A traditional teaching practice discussed among professors, such as submitting hand written assignments, was coded under Voice 1. Technology mediated activities, such as discussing digital presentation platforms were coded as Voice 2. For this layer a narrow parameter of these two teaching dynamics was maintained.

**Layer five: Culture of innovation.** This layer of coding has two parts. The first is agreement/disagreement of preliminary analysis findings and consensus of the innovativeness of those activities and experiences with iPads.

***Agreement/disagreement.*** For each professor, preliminary analysis was run connecting her democratic experiences innovating with student iPads to texts or her subsequent teaching practices with iPads. Relatively strong connections are reported with corroborative examples of activities from classroom observations. After reading the excerpt I asked the group if they agreed or disagreed that there were elements of that text in their classes. Those responses were recorded and coded under the texts/factors nodes.

***Consensus of innovativeness.*** After the agreement/disagreement discussion closes, I asked the group with a show of hands if they believed those activities were *innovative, not innovative, or neutral*, the a priori nodes under this category. Responses were also recorded in a tally sheet to member check consensus opinions at the end of each portion of the discussion (Appendix H). The majority response was coded under the respective node. If there were close counts meaning a divided opinion then both were recorded and coded accordingly. These data were intended to provide defined areas in which students asserted their opinions on innovative or otherwise teaching practices with student iPads in Early Childhood and Family Studies courses that ultimately influenced their understanding of technology use for education and advocacy purposes.

**Layer six: Suggestions.** Suggestion nodes were not predetermined; rather, they were a posteriori emerging from the open group discussions. Hoepfl (1997) supports the idea that analysis starts during the data collection process and should guide proceeding data collection and analysis methods. Students who experienced the exploration period with student iPads and shifting pedagogies with digital interactions provided insight to the phenomenon because they carried their own truth-value. Table 8 lists the categories of nodes that emerged from the focus group discussions and definitions to make my coding strategy more transparent.

Table 8

*Definitions of Suggestions*

<b>Suggestion Category</b>	<b>Definition</b>
<i>Time</i>	Time to learn the iPads
<i>Grouping</i>	Collaborative activities; grouping methods
<i>Classroom management</i>	Systematic ways to manage the devices or manage aspects of the classroom
<i>Resourcing</i>	Access to resources that enhance learning course content and iPad capabilities
<i>Practical applications</i>	Practical ways to use the iPad for future endeavors
<i>Learn the device</i>	Learning to navigate the iPad; develop digital fluency
<i>Technical</i>	Learn how to navigate through technical difficulties
<i>Consistency</i>	Regular use of the iPads throughout the semester
<i>Differentiation</i>	iPad uses that fit the technical fluency, interests, and professional goals of individual students
<i>Variety</i>	More choices of apps or platforms that apply to their related field with children, students, and families

## **Query the Data**

I used three query methods in NVIVO to elicit particular types of information from the data that addressed each research question. Three different methods were needed due to the nature of the research questions being different.

**Matrix coding.** The first is *Matrix Coding*, a system that calculates cross-references in a data table representing connections between two nodes. A large number of connections indicate a strong connection, while minimal cross-references imply a weaker connection, or minimal discussion points among professors and students in relation to those two nodes. This method is applied to Research Questions One and Two.

**Cluster analysis.** The second method, *Cluster Analysis*, is similar to Matrix Coding, but these reports are represented in a circular graphic with lines connecting any number of nodes. This is a visual tool for seeing what common and uncommon connections resulted. This method is applied to Research Question Three to illustrate how Suggestion categories are interconnected by providing more detail to their insights and recommendations for improving learning with iPads.

**Word frequency.** The third method is *Word Frequency* that is illustrated in a word cloud format, the most frequently used words from the focus groups that related to the agreement/disagreement data. This provides a visual of overall student corroboration of teaching elements for more contextualized ethnographic narratives. This method is only applied to Research Question Three analysis.

## **Research Question One**

Research Question One requires investigation of participants' experiences with democratic tactics that are drawn from the literature and any connections to subsequent teaching practices with student iPads in their Early Childhood and Family and Consumer Sciences courses. This inquiry entails triangulation of the second interview, debriefing sessions, reflections, observations, and researcher reflection data.

**Interview two.** Upon agreement of time and place with each educator-participant and the understanding that the participant could exit the interview at any time, the interview took place in a secured environment and began with an explanation that a recording device was used for transcription. The interview consisted of 20 items and took no more than one hour to complete (Appendix F). Notes and add-on questions that arose from the dialogue were incorporated into the analysis. Audio-recordings were transcribed within NVIVO and coded according to the analysis methods outlined below.

**Debriefing sessions.** The researcher sat in on recorded debriefing sessions scheduled among the educator-participants for the duration of the 1-hour meetings and is engaged consistently in these discussions, offering input and perspective. Bogdon and Taylor (1975) also suggest looking for key terms used during interactions and immediately taking notes upon exiting the observation environment to retain a better picture of events, refraining from socializing until field notes are complete, and taking notes on the physical environment highlighting

salient features. This was the time to utilize the *note making* technique to categorize data into themes that were collected or collapsed during the analysis phase (Sharples, 2007). Audio-recordings were transcribed and imported into NVIVO.

**Reflexive journals.** Professors responded to five separate reflexive journal prompts that were provided at the beginning of the study with instructions to complete them at any time prior to the date for initial analysis. These were submitted in any fashion participants preferred, including email, face-to-face interview format, or via telephone. NETS-T factors were included in the language of each prompt to help provide enriched context for the professors of what was being asked and the context of the questioning. The primary purpose of these reflexive journals was to isolate the texts and voices that emerged as they pertained to various teaching scenarios. Further, it was my rationale that professors might delve deeper into the reflexive aspect of their pedagogical choices uninfluenced by the voice of others immediately surrounding them, such as in the debriefing sessions and classroom observations. There were no parameters on length or format and reflections could be skipped if professors choose to do so. Emailed reflections were copied and pasted into NVIVO. Interview formatted reflection audio-recordings are uploaded, transcribed, imported into NVIVO, and coded appropriately.

**Researcher observation notes.** Notes of classroom observations provided evidence of teaching practices and pedagogical uses of the iPad. The note making technique I used includes a layer of semiotics, technology, or both to each action to justify or support the professors' reports of teaching practices, or texts, in the

technology mediated classroom dynamic (Voice 2) (Hartley & Davies, 1978; Sharples et al., 2007). Of particular interest are the types of activities students engage in, the apps they explore during class, collaboration techniques and course content, and practical applications for Early Childhood and Family Science professions and classroom management uses, such as iPad maintenance, storage and technical navigation.

**Researcher reflections.** Researcher reflections were created immediately following classroom observations and were imported into NVIVO (Appendix I). These provided an additional data source supporting the elements and connections that arose from data. Further they provided a quick reference of themes that emerged from the lessons or activities (ex. resourcing, creating, presenting, collaborating, child-friendly, and so forth).

**Triangulation of research question one.** Debriefing sessions, interview 2, reflexive journals, observations, and researcher reflections were transcribed and/or imported into NVIVO. I passed through the data twice, first using the democratic tactic lens and Innovation texts/NETS-T factors lens. I highlighted and dragged portions of responses into the associated nodes. I ran another Matrix Coding Query to connect democratic tactics to texts. A second Matrix Coding Query was then run to connect texts to NETS-T factors. This confirmed the categorization system for the texts because it reported the degree of connectivity between them. Connections, disconnections, and excerpts representing cross-references provided and contextualized findings for Research Question One.

## **Research Question Two**

Research Question Two is an investigation of dialogic voices and dialogic relations of the three professors in light of the democratic tactics they *may* experience during the innovation process with student iPads. Application of the first four layers of coding was required for this inquiry. By ascertaining the voices of influence that lead to pedagogical decisions, I can attribute influences of juxtapositions. Data sources included interviews 1 and 2, debriefing sessions, and reflections. The same preliminary steps for data collection outlined for Research Question One were taken for Research Question Two.

**Triangulation of research question two.** Debriefing session notes, interviews 1 and 2, and reflexive journals were transcribed and imported (or copied and pasted) into NVIVO. Each interview question, reflection response, and debriefing session note underwent four run-throughs coding salient statements into the democratic tactics, innovation text/NETS-T factors, dialogic voices, and dialogic relations categories. I performed a Matrix Coding Query in NVIVO that connected professors' democratic tactic experiences and texts to dialogic voice and relations (Woods et al., 2015). This information showed what types of teaching practices were asserted by professors from the voice of self and which were juxtaposed as they navigated through various teaching texts using student iPads. Exemplars from the data represent the cross-references to contextualize findings for Research Question Two.

### **Research Question Three**

Research Question Three investigates student opinions of innovativeness regarding their experiences with iPads over the Fall 2015 semester. Suggestions from students on how to support their development of a paradigm of technology use with children and families stemmed from an overarching developing culture of innovation in their classrooms. To address this inquiry three focus groups were formed, comprised of a purposive sample of students from each course taught with iPads by one of the three professor participants. The data sources for Research Question Three included transcriptions of focus group open discussions that had three parts. The first part was closed-ended responses to prompts asking if students agreed or disagreed that they experienced the connected texts that emerged from their professors' data from the Research Question One inquiry and analysis. I asked a follow-up question about the innovativeness of those texts. Innovative is described as an activity or experience mediated by the iPads that enhanced students' learning. Not innovative implies activities that did not enhance learning and neutral meant that an activity was neither innovative nor not innovative. These responses were recorded in a tally sheet to keep track of consensus opinions, and to member check at the end of each portion of the discussion (Appendix R). Sandelowski (2001) warns qualitative researchers of the possibility of counts to skew focus group data because of potential unvoiced opinions, but that when contextualized, counts can provide a richer narrative of focus group dynamics, such as community, negotiation, and agreement. By using this technique it lent to the trustworthiness of this study.

**Recruiting students for focus groups.** To recruit student-participants a flier was placed in the building main floor hallway and classroom doors one week prior to face-to-face recruiting (Appendix J). On an agreed upon day and time, faculty left the room while the details of the research study were delivered. This discussion highlighted the purpose, requirements, benefits, and risks and volunteer status of participation (Appendix K). I explained that there would be an audio-visual recorder to capture the discussion in its entirety for analysis purposes and protection of identity techniques are presented. Recruitment letters (Appendix L) and Consent Forms (Appendix M) were administered and collected in an envelope labeled CONFIDENTIAL and sealed. A day and time of the focus group meetings completed the discussion. Consent forms were stored in a safe located at the principal researcher's residence.

**Focus group prompts.** Focus group prompts were designed from preliminary findings of Research Question One; therefore, this portion of the investigation (Phase III) had to take place last. Questions were contextual to students' experiences with their respective instructors (Appendix G). Audio recordings were transcribed and imported into NVIVO along with the audio files for reference purposes. Classroom observation notes were recalled to contextualize classroom activities discussed among the groups and to situate students' thinking as it pertained to those texts.

**Tally chart.** A tally chart for each discussion prompt was used to count focus group members' opinions of their learning experiences under three innovative

learning experience categories: *innovative, not innovative, neutral* (Appendix H) (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009). This allowed me to be accurate with student opinions of teaching practices and activities using iPads when transcribing and coding data in NVIVO (audio-visual recording, transcription, tally chart).

**Triangulation of research question three.** Research Question Three requires different triangulation methods to address the perspective of multiple students. Focus group open discussions were transcribed then imported into NVIVO. Triangulation mirrors Glaser and Strauss's (Glaser, 1978; Glaser & Strauss, 1967; Straus, 1987) constant comparison analysis, using two of the three steps for discourse coding and analysis.

*Axial coding* is connecting categories to subcategories (Moghaddam, 2006). I connect student consensus data of innovativeness nodes to factor nodes (Homburg, Wilczek, & Hahn, 2014). In essence, this shows what connections are made between NETS-T factors and students' thoughts about the innovativeness of classroom activities that fall under each factor. One underlying purpose of this method was to explore student perspective of iPads that manifested into future professional considerations with similar devices.

I also used *selective coding*, the process of connecting core categories to other categories to validate their similarities or expose relationships. This is how I connected student suggestions to the NETS-T factors (Moghaddam, 2006). This method takes student suggestions and translates them into cohesive ideas of how

iPads could be made more effective for them as Early Childhood teachers and advocates or Family and Consumer Science specialists.

I passed through salient statements three times coding student data into the texts/NETS-T factors, innovativeness, and suggestions nodes. I ran advanced coding queries connecting texts to innovativeness and suggestions to see *if* and *where* teaching practices and student opinions of an emerging culture of innovation aligned. These data were intended to confirm the reported teaching practices and explain iPad experiences from the students' perspectives. I provide exemplars of cross-references to contextualize findings for Research Question Three.

### **Member Checking**

Member checking refers to an ongoing process of proactive confirmation of data to verify qualitative research interpretations (Creswell, 2011). Lincoln and Guba (1985) state that member checking is crucial in qualitative research for establishing credibility through confirmation of correct interpretations, opportunities to correct, refine, or expound on previous statements. In qualitative research, interpretation is contingent upon the relationships between the participant, researcher, environment, and theoretical framework (Patton, 2002); therefore, verisimilitude is highly subjective and detached from positivist viewpoints.

In this qualitative exploration, *my* truth is made more reliable because I present step-by-step procedures to substantiate the findings for each research question, evidence is corroborated by both students and professors, rigorous

triangulation of multiple data sources provides applicability (transferability to like circumstances), and consistency (triangulation of diverse data; traceable) is applied throughout the data collecting process. Further, I disclose my inductive reasoning and ecological socio-constructivist ideals that are fundamental to my position as a researcher. Should truth be skewed from this center, it can be attributed to alternative theoretical underpinnings of the reader, for there is no assumption of 'big T truth' in this research and its findings.

### **Professor Member Checking Procedure: Part One**

Once analysis was complete and excerpts and data interpretations were available to substantiate findings, a 2-hour meeting with all three professors was scheduled face-to-face. Given the fact that they are currently conducting their own Grounded research this meeting was recorded by them and did not warrant any tactics to protect their identities or data findings from one another. They welcomed sharing the information as an additional data source for their study.

The findings from Analyses I and II are provided as NVIVO matrices and tables providing the cross-references that represent strong and weak connections between experiences and teaching practices. Numbers in tables were analyzed with exemplars specific to each professor to substantiate the connections. Each professor read through the exemplars and asked questions about the definitions of terms to better contextualize the findings. Definitions were then negotiated among the four of us and incorporated into this report.

A presentation of Analysis II findings explained what factors were most notably juxtaposed among the three professors collectively. This allowed them to visualize where they took advantage of their collaborations (heterodialogue, voice of others) and where they maintained their assertions that were not necessarily juxtaposed (voice of self, autodialogue). This portion of the meeting entailed a silent review of the exemplars, from which they verbally agreed or disagreed with the data and findings. Any disagreement, for the purposes of this research in keeping consistent with hermeneutic contextualism (contextual interpretations), empathic neutrality (researcher embedded into the culture), and dialogic exchanges that lead to new meanings, codes were not changed as new information arose but, rather, additional notes were taken and included in the discussion chapter.

### **Professor Member Checking Procedure: Part Two**

For the above section on participants, upon completion of each professor's narrative, I emailed her portion asking for any requested edits or additions. The benefits of this process are threefold. It makes the participant descriptions more accurate, increases truth-value, and increases trustworthiness of this research methodology.

### **Focus Group Member Checking Procedure**

The units of analysis were the focus groups as wholes not as individual groups by instructor. According to Morgan (1997) this allows researchers to more easily identify authentic themes emerging from discussion data to address specific research questions. There were three methods used to support the truth-value (data

reflecting the culture) of the focus group data. First was the use of audio and video recorders to capture all that was said for accurate transcription. Second was a tally chart for each talking point to track a consensus of learning experiences (layer five) (Appendix H) (Onwuegbuzie et al., 2009). This was instrumental in contextualizing data in regard to classroom/group cohesion as it pertained to each text (layer two). The third method was a review the notes taken during the discussion with the students prior to the close of the session. If there was agreement to each point then no changes were made. If there was disagreement or shifts in thinking then I reviewed the tally chart for that prompt with the group and a recount was taken with a rejoinder. This part of the discussion confirmed the suggestions nodes that categorized comments students made about ways to improve iPad usage and contribute to their future endeavors with child and/or family clientele.

### **Democracy and Dialogical Self Theory for Analysis of Culture of Innovation**

Table 9 delineates all elements included in my methodology to clarify the structure and components of this ethnographic investigation of democratic innovation experiences. It reads like a flow-chart from left to right, each color representing phases of data collection.

Table 9

*Theoretical Framework Chart*

Democratic Themes	Democratic Experiences	Connected Experiences ↓ Texts	Connected Texts ↓ Factors	Connected Factors ↓ Dialogic Voice	Connected Factors ↓ Dialogic Relations	Connected Factors ↓ Student Perspective	Connected Factors ↓ Culture of Innovation
Bottom-Up Innovation	Ownership Context Learner-Centered	Texts 1-9	F 1 -5	Voice of Self -Autodialogue - Heterodialogue Voice of Others	Voice 1 (Traditional) Voice 2 (Tech-in-hand)	Innovative Not Innovative Neutral	Suggestions for ECE and Human Service practitioners
Ongoing Support	Collaboration Mentoring	Texts 1-9	F 1 -5	Voice of Self -Autodialogue - Heterodialogue Voice of Others	Voice 1 (Traditional) Voice 2 (Tech-in-hand)	Innovative Not Innovative Neutral	Suggestions for ECE and Human Service practitioners
Reflection	Reflexive Activities	Texts 1-9	F 1 -5	Voice of Self -Autodialogue -Heterodialogu Voice of Others	Voice 1 (Traditional) Voice 2 (Tech-in-hand)	Innovative Not Innovative Neutral	Suggestions for ECE and Human Service practitioners

The first blue column lists the general *Democratic Themes* for innovation that emerged from the literature. The next blue column specifies *Democratic Experiences* determined by the three professors, also generated from the literature. The first green column shows the connections that were made between *Democratic Tactics* and *texts*, or traditional and tech-in-hand teaching practices. The second green column categorizes *texts* into one or more NETS-T factors. The first red column accounts for the *Dialogic Voice* that specifies the position of the speaker when

referring to various text categorized factors. The second red column contains the *Dialogic Relation* that refers to whether a text was traditionally delivered (no tech) (Voice 1) or with tech-in-hand (Voice 2). The first yellow column provides student consensus of innovativeness of learning experiences with iPads being innovative, not innovative, or neutral. The last yellow column houses the suggestions as they pertain to that experience and their future professional endeavors with children and families. This chart demonstrates the impact of aggregated educator experiences and teaching practices exploring student iPads on the evolution of technology paradigms and a culture of innovation in this higher education setting. This methodology exposed how a bottom up innovation with student iPads in early childhood and family courses can fare in the eyes of students, and how that opinion can be traced back to teaching practices and the democratic tactic that supported these choices.

### **Connection of Texts to NETS-T Factors**

Texts serve as the observable actions taken by the three professors that manifest through a voice (Voice 1 and Voice 2) (Bakhtin, 1981a; Hermans, 2001; Hermans & Hermans-Konopka, 2010; Shields, 2007). These texts originate from the principal researcher's previous teaching and administration experiences, matriculation in both Masters (Education Leadership and School Policy) and Doctoral (Early Child Development and Education) programs, and are supported by the literature on Early Childhood teaching practices (Barron, Kember, Harmes, & Kalaydjian, 2003; Becker & Riel, 2000; Breslow, 2010; Creswell, 2011; Dewey, 1904,

1938, 2008; Gee & Hayes, 2011; Greene, 2011; ISTE, 2002; Ludvigsen et al., 2010; Moersch, 2010; Morrow, 2009; NFIE, 1996; NRC, 1999; Robinson, 2011; Roblyer, 2000; Sharples et al., 2007; Yang et al., 2013; Yelland, 2009).

Instead of taking account for a myriad of pedagogical activities, these texts narrow the scope to elements that are nested under the NETS-T factors (ISTE, 2002). The NETS-T factors are derived from a set of standards for evaluating technology-mediated pedagogy (ISTE, 2002). The rationale for connecting the fundamental elements of pedagogy to NETS-T is to add rigor to this qualitative inquiry, while also opening the opportunity to apply findings to a nationally recognized set of principles. This not only facilitates a more succinct categorization of teaching practices for analysis purposes, but it highlights factors that are general enough to allow democratic fusion of teaching paradigms to teaching practices with technology (Dewey, 2008; Morrow, 2009). Lincoln and Guba (1985) state that researchers cannot “specify the transferability of findings; he or she can only provide sufficient information that can then be used by the reader to determine whether the findings are applicable to the new situation” (p. 315).

### **Connection of Democratic Innovation Experiences to Teaching Practices**

Identifying which tactics are or are not experienced is conducive to developing a sense of the genesis of Voice 2 (tech-in-hand pedagogy). This allows for accurate ethnographic depictions of educator experiences while exploring the numerous facets of innovating with student iPads in their Early Childhood and Family Science courses. The purpose is to make stronger arguments for the

particulars of democratic, bottom up tactics within context (Dewey, 2008; Morrow, 2009).

### **Connecting Democratic Innovation Experiences to Heteroglossia and Innovative Teaching Practices**

Voice 2 and the heteroglossia (multi-voicedness) that emerge as educators transition from traditional to tech-in-hand pedagogies is proposed to stem from their experiences during the innovation process (Bakhtin, 1981a; Hermans & Hermans-Konopka, 2010; Shields, 2007). This lens reveals shifting teaching practices with iPads after a period of reflexive dialogic exploration both as individuals learning the pragmatics of iPads within the context of their instruction (autodialogue – with self) and as community members (hetero-dialogue) (Bakhtin, 1981a; Shields, 2007). Identifying the association between democratic innovation *experiences* and subsequent *heteroglossia* highlights human agency as the primary catalyst for evolving pedagogies. Agency in this regard is the bottom up enterprise of these professors negotiating what are contextually relevant teaching practices using student iPads.

### **Connecting Democratic Innovation Experiences, Heteroglossia, and a Culture of Innovation**

Student opinions of learning experiences with iPads and subsequent development of technology paradigms is the eviduciary apex of this study that explores democratic tactics of innovation and ensuing teaching practices (Dewey, 2008; Morrow, 2009; Sharples, 2005; Sharples et al. 2007; Sharples et al., 2009). The

connections between Dewey's (2008) democracy in education and Bakhtin's (1981a) dialogical relations are the contextualization of professors' innovating experiences and teaching practices. This powerful duo adds substantially to this research that inquires how cultures of innovation can evolve democratically, burgeoning innovative agendas from the professor's drafting table to the university classroom and on to growing student repertoires of professional skill using digital-era tools.

### **Trustworthiness**

Qualitative research requires a methodology for establishing rigor and trustworthiness that are appropriate for the purposes of inquiry (Krefting, 1991). Starting with a clear understanding of what "qualitative" means, one can pursue research in line with contemporary social science paradigms. Kirk and Miller (1986) define qualitative as "a particular tradition in social science that fundamentally depends on watching people in their own territory and interacting with them in their own language, on their own terms" (p. 9). This definition reads democratically, and relates directly to the theoretical framework of this research, exploring educator's experiences during innovation in fashions determined by themselves and within the community they designed (Dewey, 2008; Morrow, 2009).

Agar (1986) suggests terms used to describe a study's reliability (replicable findings) and validity (instruments measure what they are meant to measure) do not fit into qualitative inquiry, rather, terms such as accuracy of representation,

credibility, and authority of the writer should be considered. Related to this philosophy of reassigning language to match qualitative frameworks, Guba's (1981) model is used here to establish trustworthiness through four elements: truth-value, applicability, consistency, and neutrality (p. 76).

### **Truth-Value**

*Truth-value* relies heavily on confidence of the researcher in the research design, methods, instruments, and participants for finding truth (Krefting, 1991, p. 215). If experiences explained by the data can be qualified by participants and informers, or by others who had similar experiences, then the data is said to have truth-value. Further, the researcher must accurately represent the reality of the event under study, what Lincoln and Guba (1985) term *credibility*. The truth value drawn from this research was represented in the experiences of the researcher with iPad innovations that have taken place at TWU since 2012, the relationships with the educator-participants, multiple data methods, and triangulation of multiple data sources to amass truthful and contextually interpreted findings.

### **Applicability**

Applicability in qualitative research is synonymous to generalizability in quantitative research (Krefting, 1991). Given the nature of ethnographic research to be extremely contextual, generalizations were not amenable. Sandelowski (1986) explained that, "every research situation is made up of a particular researcher in a particular interaction with particular informants. Applicability, then, is not seen as relevant to qualitative research because its purpose is to describe a particular

phenomenon or experience, not to generalize to others” (p. 30). The applicability or transferability of this research is to similar contexts or like institutions where innovation with student iPads is taking place democratically. Further, this study directly applies to projects spearheaded by a small self-designated community of technology adopters attempting to implement mobile technologies. It is, thus, the responsibility of a qualitative researcher to provide rich enough descriptions of the research process so that applicability to other studies is a possible undertaking.

### **Consistency**

Consistency in qualitative research is synonymous to reliability in quantitative research, but eschews the positivist perspective of one big “T” truth (Feyerabend, 1970; Krefting, 1991). Reliability, or repeatability, intends to maintain similar findings with different populations. This antithesis to ethnographic inquiry warrants an alternative stance to seeking consistency. The extraneous variables that make ethnography unique in each study then become qualitative elements engrained in the environments in which it takes place. Krefting (1991) believes “the key to qualitative work is to learn from the informants rather than control for them” (p. 216). For consistency purposes, this research is systematic in recording variations of democratic innovation experiences, variations of teaching practices, and individual heteroglossia through triangulation of multiple methods and sources (Bakhtin, 1981a; Dewey, 2008; Morrow, 2009; Shields, 2007; Sharples et al., 2007). Guba (1981) relates this to dependability that denotes traceable variability qualified by identifiable data sources.

## **Neutrality**

Neutrality refers to minimizing researcher bias in methods and findings (Sandelowski, 1986). Neutrality was achieved in three ways in this research. First, Patton's (2002) empathic neutrality argues for a degree of closeness to a phenomenon and/or a culture to make contextually accurate interpretations, but distanced enough to not base methods or findings on biases. In this study, the researcher's immersion within the TWU culture sanctioned interpretations, while non-participatory data collection methods maintained distance. Second, triangulation of multiple methods and sources within NVIVO further neutralized findings to objective connections between data (nodes). Narrative explanations of data analyses were concomitant to this ethnographic qualitative research; therefore, researcher voice was anticipated (Bakhtin, 1981a; Chambers, 2000; Creswell, 2011; Moustakas, 1994; Patton, 2002; Saldana, 2009; Shields, 2007). Third, student focus group member checking let students be privy to initial interpretations and layer five (innovative, not innovative, neutral) tallies prior to analysis. This provided an arena for students to speak freely and to agree or disagree with any interpretations of the researcher, in which case any misinterpretations or shifting thoughts are amended for accurate interpretation.

## **Ethical Considerations**

Ethics are a matter of conducting research that benefit the corpus of literature by using practices that minimize risk, are not coercive or covert, and have reasonable expectations of participants (Webster, Lewis, & Brown, 2013). In

response to gross historical infractions of ethical practices of research, the Institutional Review Board (IRB) must approve applications to conduct research with human subjects, based on regulatory requirements of the U.S. Department of Health & Human Services (HHS.gov). Both the pilot study (exempt) and this study (full review) were approved by the IRB at TWU in 2015 prior to any participant communication or data collection (Appendices A and N).

### **Institutional Review Board Approval (IRB)**

A few key protective measures outlined in the IRB regulations include protection of privacy (identity), unethical persuasion to participate, participant rights, and proper citing of references (Patton, 2002). To relate the procedures of this research to the research questions, I delineate each part of the investigation, the associated tools, their application, and a rationale for the tool's applicability to each question. To do this it was necessary to first officially recruit university educators and then students, requiring Institutional Review Board (IRB) approval according to University Policy 1.15, Human Subjects in Research and Procedures ([twu.edu/research/irb.asp](http://twu.edu/research/irb.asp) retrieved June 30, 2015) (Appendix L).

**Privacy.** Protecting the privacy of participants was ongoing throughout the research process. In the recruitment letter I outlined the purpose, parameters, risks involved, and steps taken to protect their interests (Appendix P). Privacy was maintained in three ways in this research. First, all identifiable data, including all unique codes assigned to participant(s) and instruments, were stored in Google Drive and NVIVO, two password-protected databases managed only by the principal

researcher (Bazeley & Jackson, 2013). Second, all correspondence was copied and pasted into these databases with identifiable data replaced with codes. Printed documents were stored in a fingerprint-protected safe accessible only by the principal researcher. Third, all data (except one copy of consent forms submitted to the university) will be deleted or shredded within five years of the completion of the study. All of these protective measures are outlined in the IRB form.

**Persuasion to participate.** The three educator-participants in this study volunteered to conduct grounded research on innovating with student iPads on their own accord. In wanting to obtain an outside perspective they granted me full access to their experiences during the innovation process including classroom observations, interviews, sitting in on debriefing sessions, emails, reflections, and presentations. Persuasion was, therefore, not a factor in this scenario.

To obtain a more complete picture of the trickledown effect of educator experiences with democratic innovation tactics and teaching practices that manifested from heteroglossia, student focus groups are embedded in the research design. Focus groups were comprised of students from each class that used the iPads during the Fall 2015 semester at TWU. The ethical issue to consider was student fear of participation impacting their grades or access to information. To ameliorate this concern, recruitment flyers and letters were given to students directly from the principal researcher (not instructors) (Appendices J and L). These were not administered until November 2015, once students were established within their respective classes, acclimated to the climate and researcher presence during

instruction, and a rapport had developed with their instructor exemplifying ethical practices and relationships (Anfara & Mertz, 2006; Moustakas, 1994; Patton, 2002; Webster et al., 2013).

**Participant rights.** The governing bodies of the IRB make strong recommendations to take all precautions to protect the rights of participants by delineating risks and tactics for minimizing risk (HHS.gov). These rights include access to data and findings (debriefing), termination of participation at any point, comfortable conditions, transparency with research agendas, data collection methods, data storage methods, accessibility to the research team, and equal treatment (Ippoliti, 2015). To ensure adhesion to these rights and responsibilities, transparency of research agendas, conditions, and data were outlined in the recruitment letter, including the right to cease participation with no penalty of any sort (Appendix L). Participants were provided an e-mail address and phone number of the principal researcher, with an understanding that they could communicate in either fashion throughout the entire process. No special allowances were made to any individual participant; therefore, treatment and access were equal. Students were all undergraduates; therefore, there were no shared courses between student-participants and myself that could skew interpretations of data.

**Proper citing of resources.** Research entails a substantial amount of outside resources to preface research agendas and support claims. To maintain ethical research practices, it is essential that original authors and works be cited in text and in reference lists (Pennycook, 1996). This research is very explicit in the

methodology used to gather information on the various concepts and constructs described throughout these chapters (refer to Chapter II: Review Methods). All quotes, theories, philosophies, models, concepts, and assertions are cited within the text and a full reference list is provided in the References section.

### **Summary**

This chapter discussed the theoretical framework and the methodologies of this study to establish truth-value, applicability, consistency, and neutrality (Guba, 1981). These elements are key for credible research contributions to the corpus of literature in social science. The three research questions driving this qualitative inquiry reflect an ethnographic approach using methodologies to explore culture and human agency for innovation (Patton, 2002). There were four theoretical or philosophical features used to make connections between the broader constructs of this research, each explicated below.

#### **Dialogical Self**

Bakhtin's (1981a) Dialogical Self Theory (DST) posits a multivoicedness of individuals that evolves from endless contextual juxtapositions (dialogic voices) within one's self and with others. For educators pursuing bottom up innovation, evolving teaching practices from traditional to tech-in-hand dynamics embraced a process of acquiring a new voice; a voice that spoke from a new technology mediated pedagogical stance.

## **Democracy**

Dewey's (2008) ideas of democracy in education were applied to this study in the form of choosing what to innovate and choosing how to innovate in the classroom. The nature of democracy is emancipatory, allowing contextual rudiments to be actualized in gorgeously diverse ways (Hoffman-Kipp, 2003). Therefore, choosing to implement knowledge-mediating tools in education must be understood as influencing the intrinsic drive to change.

## **Teaching Practices: Texts**

Social sciences explore human conditions and actions in an attempt to predict or justify behaviors (Rosenberg, 1988). Education research falls under this discipline due to the complexities of human endeavors, epistemologies, and cultures that shape it. Teaching practices reflect two aspects of an educator, the professional and the personal (Bakhtin, 1981a, 1986a, 1986b; Dewey, 2008; Gee, 2000; Izadinia, 2013). To draw upon one's professional voice is to draw upon one's personal history that is engrossed in an ocean of contextual experiences, therefore, shifting teaching practices could be traced to more than one voice, it could be traced to heteroglossia.

## **Culture of Innovation**

Historically, innovation in education has not been proactive, it has been reactive, implementing technologies into classrooms to meet the needs and demands of a global economy (Baran, 2014; Bennett et al., 2012; Breslow, 2010; Cochrane, 2010; Creswell, 2011; Efaw, 2005; Hannafin et al., 1987; Herrington et al., 2014; Jackson et al., 2013; Kegan, 1994; Khalil, 2013; Legris et al., 2003; Naismith et

al., 2006; Schmidt & Ho, 2013; Suki, Suki, Eshaq, & Choo, 2010). Reactions to mobile technology in the classroom has been varied, thus, the myriad models for innovation attempt to bridge the gap between net generation students and educators (Hall et al., 1991; Rogers, 1962; Shulman, 2005; Wenger, 2000).

This research takes a proactive look at human agency for innovation connecting teaching practices and voices to address how a culture of innovation can evolve from the bottom up and engage a community of investors who seek new and improved means for teaching digitally literate student bodies. The ultimate goal is then to influence the paradigms of students who aspire to be professionals in the fields of Early Childhood Development and Education and Family and Consumer Sciences based on experiences they have in these classrooms.

### **The Connections**

Connecting texts to NETS-T factors provides a succinct categorization of teaching practices and a reference point to which interested parties can contextualize democratic tactics for themselves. Connecting democratic tactics of innovation to fundamental elements of pedagogy demonstrated how bottom up innovation influences teaching practices. Connecting democratic tactics for innovation and reflexive teaching practices to heteroglossia is the key theoretical application of this study that explores how the principle of choice and dialogic relations influence teaching practices.

The methodology I present here reflects my efforts to expose a process of shifting teaching practices and ascertain student perspectives of these practices that

advance their training for future endeavors working with young children and families. The multiple data sources and triangulation methods using NVIVO maintains an objective view of data connections and adds rigor to this ethnographic query. Chapter IV will review the findings to each of the research questions and connections to determine if this new model for iPad implementation in the university setting is viable for professors and for future early childhood educators and human service practitioners.

## CHAPTER IV

### FINDINGS

Two key problems with technology integration that saturate the literature include resistance to top-down mandates to innovate and irregular professional development structures that lack contextual and reflexive recourses to substantiate using iPads in classrooms (Bennett et al., 2012; Dalton, Hannafin, & Hooper, 1989; Harwell, 2003; Sharples et al., 2009). To provide a new path to develop pedagogical and technical skills, a democratic stance lent perspective as it pertained to bottom up experiences of three professors at Texas Woman's University (TWU) (Dewey, 1916; Morrow, 2009). The purpose behind this investigation was to explore how a democratic, bottom up implementation of student iPads took place. The theoretical framework was premised on teaching manifestations born from communication exchanges that were dialogic in nature about the iPads to determine if experiences and exchanges were fundamental agents for shifting teaching practices with student iPads. Further, the framework examined accounts for exchanges and teaching practices that influenced student opinions about technology mediated learning and classroom cultures. This chapter describes how analytic methods of ethnography were applied to address each step of this multi-tiered process.

Section One delineates the data gathering process, timeline, and relevance of each datum. I describe individual educators' democratic experiences that influenced

them as they shifted toward using iPads over a 1-year time period, and the course of actions they took in their classrooms as a result of these experiences. Classroom practices were systematically categorized into the NETS-T factors (ISTE, 2002), a technology guideline for K-12 educators, to streamline and make them applicable in diverse education settings. Section One closes with a synthesis of democratic innovation tactics connections to teaching practice categories, showing that the NETS-T factors were an appropriate categorization system for the classroom activities that took place.

Section Two provides findings for Research Question Two on the dialogic nature of the exchanges among the professors. Dialogic voices were the conversations and negotiations that prompted thought and action with iPads. Dialogic relations meant the actual dynamic of teaching practices, either traditionally without technology or with student iPads. This information explains the innovation process that resulted in various teaching practices with student iPads of each professor, categorized by the NETS-T factors for applicability purposes. Further, this section reports the degree to which texts shifted from traditional to tech-in-hand. This layer makes it more visible what teaching areas the democratic process influenced and areas that were determined to be best suited for traditional methods.

Section Three reports the findings of Research Question Three, student Focus group opinions of innovativeness of teaching practices they witnessed in their respective Early Childhood and Family and Consumer Science courses during the

Fall 2015 semester at TWU. This data extends the conversation on developing a culture of innovation in a classroom by aligning democratic innovation experiences of professors, texts manifested through their dialogic negotiations, student perceptions of those practices and, ultimately, student views of iPads as future professional educators and human service practitioners.

### **Data Gathering Process and Importance of Each Data Source**

#### **Debriefings**

Over the course of 1 year (2015-2016), three faculty members at TWU joined efforts to research their collective innovation process in the Family Sciences department with 40 student iPads using the Grounded Theory approach. As a graduate research assistant I had access to these meetings and was invited to conduct research on this phenomenon for my dissertation, taking on a role as a data collector for both projects.

The debriefings were casual in nature as they discussed teaching with the iPads. The professors stated on several occasions how much they benefitted from these weekly meetings because the exchanges of ideas were so plentiful. App and website recommendations paired with teaching practices occurred frequently in conversations despite Professor A and C having different specializations than Professor B. This was where much of the contextual discussions took place. Professors outlined specific teaching objectives as they pertained to their students' future professions as early childhood educators and advocates or human service practitioners. Sharples (2007) describes this collaborative exploration with

technology as “the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies” (p. 225).

### **Observations**

February 4, 2015 through November 10, 2015, I observed four Early Childhood Development and Education (ECDE) courses and two Family and Consumer Sciences (FCS) courses that used the iPads under the tutelage of Professors A, B, and C. In the ECDE courses the arrangement of the classrooms varied more frequently than in the FCS classrooms. Professors rearranged the tables and chairs to accommodate centers similar to classrooms for young children, or placed tables in circles for sharing and collaborating. Children’s books, art supplies, and iPad apps were available to explore, with open and reflective discussions about their experiences at the end. This exemplified the contextual considerations professors made when planning the curriculum that transferred to student experiences learning with iPads and influenced future teaching practices, a cultural propagation. All observation data was stored and analyzed within NVIVO.

### **Interviews**

Initial interviews took place March-April 2015 and provided data on baseline teaching practices such as classroom evaluation strategies, differentiation, and so forth (ISTE, 2002) (Appendix B). Follow-up interviews took place in October 2015 (Appendix F). The interviews were based on the NETS-T factors 1-5 and elicited information on emerging teaching practices with the newly acquired student iPads. This information was key in data analysis, providing connections between their

democratic innovating experiences and subsequent pedagogical shifts. The difference between interview 1 and interview 2 were the questions inquiring about traditional teaching methods versus iPad-mediated methods.

### **Reflexive Journals**

Beginning in January 2015, each educator completed five reflexive journal entries at their leisure (Appendix D). These journals allowed each educator to be reflexive of their past, present, and future projections of iPad uses appropriate for students enrolled in ECDE and/or FCS courses. By doing so, candid descriptions of their goals, struggles, and contextual circumstances that helped and hindered their innovation process was made visible. One professor stated that the reflexive journal prompts made her think about what she was doing with the iPads more purposefully. Another professor said the prompts opened her eyes to ways of thinking about the iPads that she had not thought of before. This qualitative methodology takes my presence and the instruments within the environment into account that can potentially influence participants and their actions.

### **Researcher Reflections**

Researcher reflections were completed at the close of most classroom observations, or dispersed intermittently throughout observation notes in a looser fashion. This data was important to contextualize objective information. Again, my participation in this ethnographic study was disclosed as having a presence in the environments where events were taking place, represented in these reflections.

The findings provided in the next sections make this process of democratic innovating more visible through the analysis of these data sources designed to draw out different parts of the process. Segmenting the findings by the research question strings the findings together in a sequential and logical fashion.

### **Section One: Findings for Research Question One**

Research Question One had two parts. The first part was an investigation of the connections of professors' democratic experiences innovating with student iPads to their teaching practices. The second part connected teaching practices to NETS-T factors, the broader categorization system that allowed pedagogical elements to be applicable in diverse educational contexts. Connections were simply the numbers that were reported in NVIVO that illuminated the data. Below is

Research Question One:

What did educators experience during the process of exploring and implementing student iPads, and how did that evolve teaching practices in their Early Childhood Development and Education and Family and Consumer Sciences courses?

#### **Democratic Tactics Connections to Texts**

The data necessary to answer Research Question One included all debriefing session transcripts, follow-up interviews, reflexive journals 1-5, observations, and researcher reflections. In essence, this question inquired what each educator experienced as it related to the literature on democracy and implementation practices with iPads (Dewey, 2008; Lefoe et al., 2009; Morrow, 2009).

**Bottom up.** The first of these tactics was bottom up innovation. Bottom up referred to educators innovating as a result of their own enterprises to advance their teaching repertoire in the wake of 2.0 technologies that are thriving throughout the various ecosystems of society in this digital era. There were three sub-categories of bottom up tactics substantiated in the literature: ownership, context, and learner-centered (Kukulska-Hulme, 2012; Sharples et al., 2007; Traxler, 2009, 2010). Ownership was the ability to manipulate the iPad, apps, and digital spaces online as one chose (Bennett et al., 2012; Cochrane, 2010; Drouin et al., 2014). Context referred to specific actions taken with iPads in consideration of the course content or teaching objectives (Baran, 2014; Kazempour & Amirshokoohi, 2008). Learner-centered activities in and outside of the classroom were actions that focused on professors' interests, goals, and skills (Carlson & Gaudio, 2002; Drouin et al., 2014).

**Ongoing support.** Ongoing support was the second innovating practice that included collaboration/community, the self-designed group formed by professors and the interactions among them, including mentoring and providing insight as idea leaders (Afshari et al., 2009; Becker & Riel, 2000; Carlson & Gaudio, 2002; Dexter et al., 1999; Dooley, 1999; Efaw, 2005; Hineman et al., 2015). These activities involved two or more people discussing a topic of interest in regard to student iPads.

**Reflection.** The third democratic innovating tactic was reflection. At the beginning of this research project I understood reflective and reflexive to be very similar, but realized over time that there were distinct differences. Reflective

activities mirrored looking to past experiences to determine future actions.

Reflexive activities delved deeper into reasons behind choices, such as confidence, insecurity, or management issues. Although these two concepts are contained under reflection, they serve different purposes. Reflexive activities were included because they are introspective by nature and align with the concept of dialogism (Shields, 2007).

### **Democratic Tactics Connections to NETS-T Factors**

To succinctly categorize teaching practices, or texts, the NETS-T factors were employed throughout the analysis. The NETS-T factors were a combination of teaching elements, connected by substantial cross-references, or dual-coded portions of transcripts, generated within NVIVO. Cross-references were ascertained by coding transcripts into two of the a-priori nodes, the texts nodes and the factors nodes. Higher numbers implied substantial occurrences of dual coding.

The first part consisted of nine texts, or common teaching practices in ECDE classrooms as per the literature on best practices and my own experiences in early childhood classrooms over the course of a decade. These included: classroom activity evaluations, student output evaluation, curriculum planning, learner-centered activities, multi-modal resourcing, reflection, community building, management, classroom rules, and differentiation (Dogan, 2012; Koole, 2009).

The second part connected factor nodes to text nodes. Factors included: Facilitate Student Learning and Creativity, Design and Develop Digital Age Learning and Assessment, Model Digital Age Work and Learning, Promote Digital Citizenship

and Responsibility, and Engage in Professional Growth and Leadership (ISTE, 2002). Each of these factors categorized multiple teaching elements but remained independent from one another as they had unique qualities in their pedagogical functions.

### **Reading the Democratic Tactics to Texts Table**

When reading across the grid along each tactic (See Table 10), the strength or weakness of connections to a text is relative to the other connections and must be interpreted accordingly. This is the case for each tactic. For example, 10 connections to a text may be considered substantial if the other texts have much lower numbers, but 10 may be considered minimal if there were much higher numbers to other texts within the same row. Although this is a qualitative study, NVIVO generates findings from analyses in numerical fashion, requiring researchers to employ methods such as hermeneutic contextualism that is contextually embedded to interpret the numbers so they accurately portray participants, actions, and the phenomena under investigation (Horowitz, 2006; Patton, 2002).

### **Professor A Findings**

Before synthesizing the democratic experiences of the three professors as a whole, it was prudent to investigate individual professors because of the ethnographic design of this study. Portraying the experiences of individuals allowed me to find differences and similarities in their teaching practices that grounded the next findings about their self-designated community and student perceptions of teaching practice categories.

### **Professor A: Overview**

Professor A is a tenured faculty member at TWU and a key consultant of innovation proposals within the Family Sciences Department. In 2012 she spearheaded a research study exploring faculty iPads in the College of Professional Education (COPE) at TWU, from which she was able to expand that program to the students and, thus, the genesis of this project at hand. Her expertise in technology integration in conjunction with her expertise in Early Childhood Development and Education made her well suited to take on such enterprises, therefore, her agency in employing democratic tactics to innovate with student iPads in her courses was visible. Some basic skills she supported included web searches, online collaboration/networking tools, digital presentations, electronic portfolios and resumes, second life, and so forth. Although there was no student iPad project in existence at that time in the Family Sciences Department, Professor A encouraged her students to seek out resources that would assist them with developing digital skills and plant the seeds of digital citizenship.

### **Professor A: Ownership**

Table 10 provides the results of the Matrix Coding within NVIVO as it pertained to professor A's data, connecting her democratic experiences to texts, or her responsive teaching practices to those experiences.

Table 10

*Professor A Connection of Democratic Tactics to Texts*

Democratic Tactic	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Ownership	0	0	0	1	3	0	0	0	0	1
Context	3	5	6	9	3	11	12	0	4	8
Learner-Centered	4	7	2	12	1	13	8	0	4	8
Collaboration/Community	0	0	1	1	2	1	2	0	0	0
Mentor	3	3	4	6	3	14	8	0	0	3
Reflection	6	6	4	7	2	20	8	0	2	7

*Note.* T1: Classroom Activity Evaluation, T2: Student Output Evaluation, T3: Curriculum Planning, T4: Learner-Centered Activities, T5: Multi-Modal Resourcing, T6: Reflection, T7: Community & Culture, T8: Institutional Support, T9: Classroom Rules, T10: Differentiation

Professor A had consistently low numbers of connections between ownership and teaching texts. According to the contextual data, issues with ownership stemmed from her concern of safety and security of student information, as well as discussions about student preferences to use the devices they owned in class. As the semester progressed, students settled into the device they preferred in light of the resources made available to them. This lack of ownership impacted Professor A teaching practices in that she added content in the form of security instructions, such as iPad maintenance and management. Further, she was limited by what students could download or what could be purchased, and by the technology infrastructure, such as bandwidth, firewalls, and so forth. These exemplars of conversations regarding ownership serve to show why there was *disconnect* between this democratic tactic and texts.

Table 11

*Professor A Ownership Exemplars*

Source	Exemplars	Text
Debriefing	<p>“B: How many of your students bring their own devices and don’t use the iPads at all?</p> <p>A: I have several but they ask for permission.”</p>	<p>T5: Multi-Modal Resourcing (3 connections)</p> <p>T10: Differentiation (1 connection)</p>
Debriefing	<p>A: “We’re going to have to give them steps on okay, so you go home, you have a computer, you have a cell phone, you have this, these are the way you can access, these are the ways you can extend your learning in the classroom.”</p>	<p>T5: Multi-Modal Resourcing (3 connections)</p>
Observation	<p>Notes: Classroom reviews how to keep their information safe:</p> <p>“Go to settings, clear cookies, clear history. A student suggests how to do it because that’s how she does it on her phone.”</p>	<p>(Ownership note)</p>

Table 12 below is the Matrix Coding results within NVIVO as it pertained to Professor A data, connecting her ownership experiences to factors. Connections refer to cross-references, or dually coded content that was coded in both the text and factor nodes.

Table 12

*Professor A Ownership Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Ownership	0	1	4	2	2

The data showed minimal connections between ownership experiences and all factors, meaning there were minimal cross-references of texts and text categories to ownership, making ownership nearly absent in dialogues with Professor A. A minor connection surfaced between ownership and F3, but after contextualizing these findings with observation notes and researcher reflections, cross-references primarily pertained to planning the “smart room” which is the next phase of their own grounded research plans. Other topics included technical difficulty with keyboards and student preference for their own smartphones or home computers to support their learning and communications. Reasons behind this disconnection mirrored prior findings of technical and managerial barriers impacting Professor A’s ability to push her innovation beyond the capabilities afforded by the infrastructure as it stood at that time.

### **Professor A: Context**

There were connections between Context and all texts except T8, Management, which was not connected to any democratic tactics and is discussed in Chapter V. Most substantial connections were to T6, Reflection, and T7, Community and Culture. Minimal connections were to T1, Classroom Evaluation, T5, Multi-Modal Resourcing, and T9, Classroom Rules. In light of the stronger connections to more introspective practices, the departure from regimented and outlined activities emerged from the data. My role as an empathically neutral observer allowed me to draw this conclusion according to the observation and debriefing data. Professor A continuously referenced getting students to think and reflect on appropriate

teaching practices with young children, which is contextual in nature. This reflexive aspect to her placing iPads in context are shown in these exemplars connecting the context democratic tactic to texts (Table 13).

Table 13

*Professor A Context Exemplars*

<b>Source</b>	<b>Exemplars</b>	<b>Text</b>
Interview 2	“They need to hear themselves ask the problem, as the mediator, so I allow language to occur; I give time and space to learn with those types of situations, so I structure the classroom where there is not just one approach. I’m giving them time to digest it, interact with it, and interact with each other.”	T6: Reflection (11 connections)
Reflection	“I think I’m worried about student safety and privacy and I’m constantly telling them to clear out their history and for them to think about what their students do. Students being exposed to content they shouldn’t be or the rights to some content. Like something like doing a mash-up with songs and pictures and showing it at an assembly, that’s not good because you don’t have permission. There are rules but do we box ourselves in? I teach them about FERPA and what practices they use in their profession and showing parents and immigrants help educate them on how to integrate and monitor students, as a citizen and as a professional.	T6: Reflection
Reflection	“We also set up a Pinterest board for DAP [Developmentally Appropriate Practice] and if I wanted to I could have them share the board with everybody and require it, but I didn’t require it so no one did anything with it, but the seed is there. But you can’t require culture. But that’s very cultural, that’s social networking, a tool in class and gave them opportunities to share and keep up with ideas.”	T7: Community & Culture (12 connections)
Observation	“A asks students to take out autobiographies to share with groups. Each student was given a list of values. Groups were instructed to share autobiographies, review values, and come up with a group values statement...this is to be related to their vision of tomorrow’s child.”	T6: Reflection & T7: Community & Culture

The strongest text connections, overall, were to Context (Table 8). Professor A took the context of her courses into consideration when planning and executing texts that fell within all factor categories. The course she taught both semesters was *Foundations in Early Childhood Education* (FS 3663), an undergraduate course described as providing students:

*Theoretical and historical foundations of early childhood education programs; preschool and kindergarten goals, childcare, staffing, management, and evaluation; trends and issues including legal mandates, special needs, and teacher responsibilities.* (Fall 2015 3663.02 Syllabus, TWU).

Pronounced connections were between F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership, and are highlighted in yellow. Cross-references addressed several broad areas. The first was developing understanding of tools that assist in teaching young children, including applications and collaboration tactics modeling shared learning. The second were discussions negotiating traditional vs. technology-mediated activities. The third area was navigating the iPads and differentiating activities in class based on varying levels of technical ability and student professional goals. The last areas were mitigating technical barriers and reflection of course content.

Having taught this particular ECDE course twice before, I understand the breadth of topics covered. It was reasonable that Professor A had a propensity to engage in teaching practices that applied to real-world scenarios using the iPads. In addition, Professor A's paradigm that content takes priority over technology also corroborated with the data in line with determining the most appropriate teaching

dynamics to optimize student learning, whether traditional or mediated by the iPads.

Table 14

*Professor A Context Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Context	15	10	27	15	19

**Professor A: Learner-Centered**

There were connections between Learner-Centered democratic tactic and all texts, with the strongest to T4, Learner-Centered Activities, and T6, Reflection. Although slightly weaker, T2, Student Output Evaluation, T7, Community & Culture, and T10, Differentiation, also connected to Professor A’s learner-centered innovating tactic.

I noted multiple examples in which students were given freedom to choose how to show and submit work, allowing for learner-centered preferences of applications, platforms, and presentation styles. Students presented with peers to illustrate content they created together such as classroom and outdoor environments for young children. Students also had intermingled skill levels with the iPads, promoting student-to-student mentoring in their collaborative activities, particularly in regard to iPad and app navigation and content building. This data corroborates with the findings from the NVIVO analysis. Professor A’s agenda as she explored student iPads was to develop better technical skills while also evolving her

paradigm in technology mediated dynamics in her ECDE courses. These agendas transferred to what she wanted to make available to her students. Inter-connections that emerged from the data are exemplified in the excerpts in Table 15.

Table 15

*Professor A Learner-Centered Exemplars*

Source	Exemplars	Text
Debriefing	“If they did not have that kind of app [Kahoot], and those tools to represent their thinking, they chose the nature of how that functioned, even the one who had kind of more of a varied approach to it, more flexible, even <i>that</i> student was challenged by the nature of that app. But they chose to share what they knew about that theory, you know what I’m saying, and that the choice in their choice of the app shows their thinking about the theory.”	T4: Learner-Centered Activities (12 connections)
Interview 2	“[T]he concepts are evaluated even in that activity for those who choose to revise and resubmit because something must have happened there, not necessarily with the iPads but maybe having to do with seeing other people’s work, ‘Oh, I want mine to look like that!’ ‘Oh, you had four parts we were supposed to cover in my summary? I’ll resubmit.’ I automatically, now in my grade book, every time I set up the detail for submission, I put ‘multiple times’ ‘unlimited times to submit’ which screws up due dates but I’d rather them process it and submit it again and do some more work than just check it off their list.”	T6: Reflection (13 connections)
Debriefing	“If you think about the cultural piece of technology, there’s so many types of cultures in the acceptance of technology and maybe there’s a microcosm in the classroom from the pre-service teacher or college student stand points.”	T7: Community & Culture (8 connections)
Debriefing	“They got to choose how to show their theories, and it’s funny because it really highlighted what they were interested in. They launched right into the game, they didn’t even mention their theory; they didn’t provide any underlying tenant; they didn’t even say their names. They just launched right into it, and it was all out the score, about how the game worked. And then I had to bring it back around all the time to theory, which I think is interesting.”	T2: Student Output Evaluation (7 connections)

These exemplars show how Professor A engaged in dialogue about learner-centered practices to engage students, impress a sense of ownership of their learning, and determine grading strategies.

Professor A had connections between the Learner-Centered tactic and all factors. The strongest connections were to F1, Facilitate Student Learning and Creativity, and F3, Model Digital Age Work and Learning. The Learner-Centered tactic, at the time of the Focus Group gathering in November 2015, had the strongest connections to F2, Design Digital Age Learning & Assessment, F3, and F4, Promote Digital Citizenship and Responsibility. This shift was attributed to the increase of dialogue among the professors in their debriefing sessions related to ways to get students to be creative with making their learning more visible, while conversations regarding assessment and digital citizenship waned in a relative sense. Further, this indicated that Professor A employed more learner-centered tactics toward the end of the semester through development of her own understanding of student iPad affordances for her particular group of students. One influential event came from a technology meeting Professors A, B, and C attended at TWU that discussed embedding html codes into Blackboard. Professor A expressed great interest in sharing this information with her students and demonstrated this tool in her next class. Topics under factor 1 included developing student portfolios, presentation platforms, and connecting content and early childhood development and education theory to appropriate practices with young children. Topics under F3 included multi-modal resourcing, individualizing activities according to student professional

goals, research strategies, reflecting on purposeful choices of activities for children, and diversity in the digital world.

Table 16

*Professor A Learner-Centered Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Learner-Centered	14	13	16	*12	13

**Professor A: Collaboration/Community**

Professor A findings reflected fewer connections or no connections between Collaboration/Community and all texts. Texts with one or two cross-references to this tactic were T3, Curriculum Planning, T4, Learner-Centered Activities, T5, Multi-Modal Resourcing, T6, Reflection, and T7, Community and Culture. Cross-references were primarily in relation to specific applications used with student iPads in other courses by other professors, such as Kahoot or 3D GameLab, but due to the minimal number of web-based applications used by all three educators, there were few instances of collaboration to advance texts beyond occasional classroom activities using those platforms. Further, the degree to which their access had been limited by technical or management barriers hindered expansion of the innovation. The initial phase of this project was building the technical infrastructure that required a larger degree of collaborative efforts, but that process was prior to IRB approval;

therefore, much of that data is not represented here, which can be considered a limitation of this research and impacting the findings on experiences with community/collaboration tactics. The excerpts in Table 17 illustrate the few connections Professor A had between the Collaboration/Community democratic tactic and texts.

Table 17

*Professor A Collaboration/Community Exemplars*

<b>Source</b>	<b>Exemplar</b>	<b>Text</b>
Interview 2	"I find myself gravitating toward things that aren't iPad related but pedagogy related things, like Jigsaw. How activities are structured. But I need recommendations for apps. I can't keep up so I give up looking or I wait until someone tells me."	T5: Multi-Modal Resourcing (2 connections)
Reflection	"Well, I think we develop a classroom community. The QEP [Quality Enhancement Program] would like us to use the devices to assist in that but I don't do it yet. I seek to establish small groups of community and a sense of community in the class. Opportunities to make decisions, change rubrics, opportunities to provide input but I don't think the devices assist in that."	T7: Community & Culture (2 connections)

There was a connection between Collaboration/Community and F3, Model Digital Age Work and Learning. In reviewing the cross-references, topics frequently were discussed in the debriefing sessions including technology infrastructure, platform recommendations for classroom presentations and content delivery, and technical barrier mitigation strategies. These discussions were geared toward furthering teaching practices with iPads and expanding technical capabilities within their courses.

Table 18

*Professor A Collaboration/Community Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Collaboration Community	3	2	10	5	7

**Professor A: Mentor**

There was one prevalent connection between Mentoring and T6, Reflection, and a relatively weaker connection to T7, Community & Culture. From my perspective using hermeneutic contextualism, this was attributed, to some degree, to the role Professor A played in the collaboration among the faculty-participants. Her tenure, technical and pedagogical expertise, and contributions to the discourse frequently placed her in a role-model position, *lending* mentoring to her colleagues in most instances. This role was in line with Burns’ (2013) “techno-enthusiasts” or Hogue’s (2012) “idea leader” proposed in the literature. Mentoring will be described in more detail in the Chapter V Discussion.

All three professors provided valuable mentorship throughout the project, but Professor A’s position as a leader was highly visible within their small community. This may have contributed to lower cross-references of *receiving* mentoring, which was the original definition of mentoring in this study. It became prudent later on when student data was collected to expand the definition of mentoring to include *providing* mentoring, *desiring* mentoring, and *student-to-*

*student* mentoring. The coding system within NVIVO did not represent these as subcategories because the activities of ongoing support through collaboration and lending ideas was maintained under the umbrella code, mentoring. Exemplars in Table 19 reflect these connections as well as some weaker ones that exemplify Professor A's provision of mentoring to students and colleagues.

Table 19

*Professor A Mentor Exemplars*

<b>Source</b>	<b>Exemplars</b>	<b>Text</b>
Debriefing	"You can tie that back to your play class. You can tie that to the content of the class and making choices on materials selection."	T6: Reflection (14 connections)
Interview 2	"[I am a] Facilitator, trouble shooter, town fool, sometimes purposefully so they can problem solve and then point out what they did to solve it. If I solve it for them then they haven't done anything."	T6: Reflection
Interview 2	"They shared all of their individual curriculum projects that they can gather and eventually put into the guidebook and share with each other, that's a culture. But that's not iPad, that's blackboard. iPad is just a tool. It's just a pencil. So that's a culture. I'm having them share with each other."	T7: Community & Culture (8 connections)
Reflection	"One of the biggest things I do is teaching them to acknowledge what they find, not just netiquette but being a professional, what is gained from what was said and how is it connected to your learning so you can consider it as an extension of what you know. It's ok to have truncated speech in text but not in school. Academic language is different than personal language and knowing this is what you paid for. Be careful how you use your windows into information."	T5: Multi-Modal Resourcing (3 connections)
Reflection	"They used the iPads to take quizzes. A lot of them had them open and were using them and then sharing them which I didn't ask them to, which is a cool unintended consequence."	T1: Classroom Activity Evaluation (3 connections)

Professor A's mentoring experiences were robustly connected to F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership. This data mirrored the data connecting democratic tactics to texts, in that the mentoring experienced by Professor A was primarily given, not received. Further, mentoring was provided to both students and colleagues by Professor A. Cross-reference topics were pedagogical in nature, expressing prioritization of content over technology as well as prompting students to reflect on their learning and future teaching endeavors with young children and families.

Table 20

*Professor A Mentor Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Mentor	10	9	17	11	16

**Professor A: Reflection**

There was one connection between Reflection and T6, Reflection, with weaker connections to T1, Classroom Activity Evaluation, T2, Student Output Evaluation, T4, Learner-Centered Activities, T7, Community & Culture, and T10, Differentiation. Much of the discourse among the three educators included reflection, reflexive activities with students, or suggested a reflection of teaching practices as successful or in need of fine-tuning. Professor A referred directly to her own purposeful reflections following class sessions, as well as her intent to promote

student reflection of learning in her courses. Table 21 provides excerpts about reflection and her goal to impress upon her students the importance of reflecting on what it means to teach young children and work with families.

Table 21

*Professor A Reflection Exemplars*

Source	Exemplars	Text
Debriefing	<p>“A lot of students complained about using the iPads last semester because it wasn’t a technology class. ‘Why are we even using them?’ They would complain about the tool use. So I’m very cautious about even talking about it when it isn’t just supportive of gaining access to the content. Every now and then I’ll say ‘that was good problem solving. You could use that as teachers.’ In curriculum building I try to tie it back to the content of the course. But, yes, what a powerful tool to get them thinking and being reflective about the process of those types of things from their perspective since their consumer oriented, ‘I’ve paid to learn about THIS, not THAT.”</p>	T6: Reflection (20connections)
Debriefing	<p>“So that’s strange because I never thought about the cultural differences in the class in relation to technology until we got the cart.”</p>	T7: Community & Culture (8 connections)
Reflection	<p>“I’m a patient person. I put myself in the newbie position. It struck home when I did second life so I keep it in the forefront that not everyone’s in the same place. And the way you grade sometimes doesn’t address the differences in students so I’m sure to grade the content knowledge and not the mechanical aspect but I still want them to learn.”</p>	T10: Differentiation (7 connections)
Debriefing	<p>“Some are missing, and some are early, and some are late. I don’t know. I don’t know that I would think about the personality of the class at this point in the semester if I hadn’t had that experience. So I don’t know how to describe this analysis, how to prompt me to think about how the students <i>function</i>.”</p> <p>“Researcher: But you’re trying to get them to develop a paradigm.</p> <p>A: Maybe that’s inappropriate to ask of them?”</p>	T2: Student Output Evaluation (6 connections)

The Reflection tactic included reflection about past experiences with iPads and with students, as well as reflexive activities that introspected the reason behind any decisions or actions taken (Table 22). Reflection typically occurred in debriefing sessions while reflexive activities manifested in texts and surfaced in reflexive journals. The strongest connections were between Reflection and F3, Model Digital Age Work and Learning, F4, Promote Digital Citizenship and Responsibility, and F5, Engage in Professional Growth and Leadership.

Overwhelmingly, discussions pertained to making learning visible using the iPad in various learner-centered and reflexive ways. Her purpose was to impart a sense of purpose when determining appropriate practices with children. Again, the example of embedding html codes into Blackboard demonstrated Professor A reflecting on previous practices with Blackboard, then a reflexive implementation of this information into future class lectures. Professor A was consistent in conveying the importance of having a purpose behind classroom planning and activities with children as a way of gaining insight into pedagogically sound practices that aligned with her students' developing paradigms. In addition, she introduced some fundamental security measures to use with the iPads such as clearing caches and signing out to prompt reflection of their role as child advocates both in classrooms and in digital spaces.

Table 22

*Professor A Reflection Connections to Factors*

<b>Democratic Tactic</b>	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Reflection	8	8	14	13	17

**Professor B Findings**

**Professor B Overview**

Professor B has been a professor at TWU since 2013, specializing in Family and Consumer Science teacher preparation and technology integration. She spearheads monthly technology meetings, reviewing innovative teaching practices with the tools available to faculty at TWU. Her expertise in technology integration in conjunction with her expertise in teacher preparation substantiated her agency in employing democratic tactics to innovate with student iPads in her courses.

**Professor B: Ownership**

Table 23 shows the results of the Matrix Coding within NVIVO as it pertained to professor B data connecting her experiences to texts.

Table 23

*Professor B Democratic Tactics Connections to Texts*

Democratic Tactic	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Ownership	0	0	0	1	3	0	0	0	0	1
Context	4	5	12	9	5	8	10	0	5	10
Learner-Centered	7	8	4	17	4	11	8	0	3	9
Collaboration/Community	2	2	7	2	3	1	3	1	0	1
Mentor	2	3	4	2	2	4	2	1	0	2
Reflection	7	7	5	7	1	17	6	0	2	6

*Note.* T1: Classroom Activity Evaluation, T2: Student Output Evaluation, T3: Curriculum Planning, T4: Learner-Centered Activities, T5: Multi-Modal Resourcing, T6: Reflection, T7: Community & Culture, T8: Institutional Support, T9: Classroom Rules, T10: Differentiation

There were low numbers of cross-references between Ownership and all texts. In line with results for Professor A, according to the data, infringements on ownership stemmed from concern of safety and security of the device and students, as well as student preferences for the devices they owned. This lack of ownership influenced Professor B teaching practices with frequently interjected technical content regarding privacy and security. Exemplars of conversations regarding ownership in Table 24 serve to show why there was disconnect between the ownership democratic tactic and texts.

Table 24

*Professor B Ownership Exemplars*

Source	Exemplars	Text
Debriefing	<p>“I feel sometimes in order for it to be really effective they need it to be a personal device. They need their own device. They need the thing that I can take home and do this, continue this activity on.”</p> <p>“Part of it is showing them how to do things that can be done on any device, not making it device specific.”</p>	T5: Multi-Modal Resourcing (3 connections)

Ownership, again, had faint connections to all factors with one relatively prominent connection to F3, Model Digital Age Work and Learning (Table 25). Cross-references pertained to the development of the Family Sciences innovation project to a larger scale, as well as the ownership of multiple smart devices outside of TWU used for extending learning outside of the classroom and finding resources that support the course content.

Table 25

*Professor B Ownership Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Ownership	0	1	5	2	2

**Professor B: Context**

Connections to Context were strongest between T3, Curriculum Planning, T7, Community and Culture, and T10, Differentiation, with weaker, but notable2

connections to T4, Learner-Centered Activities, and T6, Reflection. Professor B's courses I observed using student iPads were *Occupational Issues in Family Sciences* and *Family Housing*. These subject areas were outside the expertise of both Professor A and C, therefore, the contextual considerations in preliminary planning and execution of texts for Professor B was substantial. The excerpts in Table 26 highlight these contextual considerations and how aspects of context were connected with choices she made in planning the curriculum, building community in the classroom, and creating learner-centered activities.

Table 26

*Professor B Context Exemplars*

<b>Source</b>	<b>Exemplars</b>	<b>Text</b>
Interview 2	"I try to think about what we're doing with the iPad through the semester so we're not doing the most complicated task first. I introduce the iPad as a way to access 3D GameLab and then think about housing specifically."	T3: Curriculum Planning (12 connections)
Debriefing	"Last time [semester] they all came to me and they all waited for me to answer their questions, and this time they're helping each other, but I don't know if part of it is how I respond because I would say 'there are people around who can help'."	T7: Community & Culture (10 connections)
Interview 2 Observation [notes in brackets]	"Then doing the scavenger hunt and things like taking pictures [of types of housing structures], or other activities that they are familiar with as opposed to 'here, make a presentation.' Then I let them choose how to present."	T4: Learner-Centered Activities (9 connections)
Interview 2	"Letting them at different levels, of how much they wanted to use the technology alleviated them from feeling graded on tech savviness, especially in a class [housing] where they don't see the direct connection to technology. I want them to feel like they can experiment but won't fail."	T10: Differentiation (10 connections)

Context had strong connections to F1, Facilitate Student Learning and Creativity, F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership (Table 27). Discussions in debriefings and interviews revealed ongoing negotiations about platforms on the iPad that service the needs of professors' teaching agendas, particular to Professor B courses. Web-based applications that allowed for live streaming communications and productivity apps on the iPad appeared to be of main concern to Professor B.

Considering the very practical nature of her courses, Professor B utilized the iPad for resourcing purposes regularly. She encouraged students to look outside of their own cultures to examine cultural artifacts from around the globe. Although there were cultural differences in their findings, she also sought to tie together the common threads. Her frequent theoretical reference to Maslow's Hierarchy of Needs (1942) exemplified universal humans needs that she encouraged her students to address in their projects and in class discussions. These topics are practical and essential to Family and Consumer Sciences, requiring pragmatic activities that prepare them for their professional responsibilities of this field.

Table 27

*Professor B Context Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Context	15	7	23	12	16

## Professor B: Learner-Centered

Professor B's strongest connection to the Learner-Centered tactic was T4, Learner-Centered Activities, followed by a connection to T6, Reflection. Professor B democratic learner-centered experiences innovating with student iPads influenced her practices teaching with them. Table 28 provides some examples of her goals for students as she reflected on how to provide them opportunities to choose what was meaningful to them. They show how she reflected on the appropriateness of the iPads for classroom activities regarding housing and the reflexive nature of her text projections for future semesters.

Table 28

### *Professor B Learner-Centered Exemplars*

<b>Source</b>	<b>Exemplar</b>	<b>Text</b>
Debriefing	"I feel like I want to give students lots of freedom. I want to tell them to make choices and be interactive, and make choices of how you want to make your presentations."	T4: Learner-Centered Activities (17 connections)
Interview 2	"Its funny because I really walked into this semester thinking that would a great use of the iPads [plan a dream house] and then when I got to that point I was like 'no'. It'll be interesting to see when I teach the class again if I do it and how that works or if we do both like we sketch first then put it in there."	T6: Reflection (11 connections)

Similar to Professor A findings, Learner-Centered had prevalent connections to F1, Facilitate Student Learning and Creativity, F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership (Table 29). Cross-references showed a consistent plan for students to explore iPad capabilities

through choice of presentation platforms and styles, both in groups and independently. Making learning visible with flexible rubrics was embedded into the assignments given to students, exemplified in the language that expressed a desire for students to be creative with the tools provided to them. Professor B data also shows instances of direct instruction of learning with iPads, such as building content in Haiku Deck, and exploring elements of various platforms for designing professional portfolios.

Table 29

*Professor B Learner-Centered Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Learner-Centered	19	13	15	10	16

**Professor B: Collaboration/Community**

The findings for democratic tactic, Collaboration/Community, illustrated fewer connections to texts overall, although T3, Curriculum Planning, connections were relatively noticeable with seven cross-references. Upon review of the data, connections were made in relation to collaboration and community within the classroom, in outside contexts, and among the team of professors, although not necessarily abundant in the corpus of data. Professor B is deeply embedded in the technology culture within the department, therefore, it was prudent to employ hermeneutic contextualism to provide trustworthy interpretations. Table 30

provides examples of these connections within the various communities Professor B was involved in.

Table 30

*Professor B Collaboration/Community Exemplars*

Source	Exemplars	Text
Interview 2	“Sometimes I have things in mind and then other times as I hear [Professor C and A] talking I hear what they’re doing in their class and I get reminded about things like TodaysMeet, which is a technology I used to use but don’t use now. I thought ‘Oh, I could use that when I’m doing a movie’ so I planned to use it for the movie and that ended up being a very interactive class that day. I thought from our debriefing session that that would fit well with what I have planned.”	T3: Curriculum Planning (7 connections)
Interview 2	“They [debriefings] are awesome because they’ll mention, ‘Oh, I used it for this’ and I’m like ‘Oh, I’ll try that and see if it will fit in somewhere!’”	T3: Curriculum Planning
Interview 2	“I think it would be amazing for faculty to have a forum for sharing across disciplines because even, I have a friend who is an instructional designer at one of the community colleges and I will sit with her and have a conversation for 30 minutes about what I’m doing in some of my classes and stuff she’s doing in hers and I walk away with ten new ideas, and we don’t teach the same content but just hearing how they’re integrating technology helps me so much and so to have that at a local level with more ideas, I would love that.”	T5: Multi-Modal Resourcing (3 connections)
Interview 2	“Have you heard of ‘EdCamps’? They are usually on a Saturday geared toward K-12 teachers. They are not formal presentations, they are all conversations and discussions about those topics and I learned more by going to an EdCamp than I have learned going to a three or four day conference that I spend hundreds of dollars to go to and this is free and focused on, like very teacher focused, and is very focused on the people in the room right then and what they want to know and I like that.”	T3: Curriculum Planning  T5: Multi-Modal Resourcing

There was one notable connection between Collaboration/Community and F3, Model Digital Age Work and Learning. The abundance of cross-references over all other factors directly reflected Professor B's involvement in multiple communities exploring technology for pedagogical purposes. Her multi-modal explorations showed a large impact on her teaching practices that pushed students to expand their repertoires of understanding within collaborative formats.

Table 31

*Professor B Collaboration/Community Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Collaboration/Communit	5	2	13	5	6

**Professor B: Mentor**

There were connections between Mentoring and all texts, but they were steadily weak with minimal cross-references. Among the low numbers, T3, Curriculum Planning and T6, Reflection, both equaled in having four cross-references. These references mirrored the texts findings for Collaboration/Community. Professor B sought technical and pedagogical support from multiple resources, both in and outside of the Family Sciences iPad project team.

Table 32

*Professor B Mentor Exemplars*

Source	Exemplar	Text
Interview 2	<p>“They [colleagues] are awesome because they’ll mention ‘Oh, I used it for this’ and I’m like ‘Oh, I’ll try that and see if it will fit in somewhere!’ I think it’s most important to look at the content I’m trying to teach and find the tool that fits the best rather than accommodating ‘cool apps.’ I want there to be a logical purpose for it and different people do it differently. I want to know how it’s going to play out before I do it in class with them. I’m not adventurous enough. I know there are faculty members who do that but I am not one of them. I think that comes from a background in tech support and like I want to be prepared for all contingencies for them.”</p>	T3: Curriculum Planning (4 connections)
Debriefing	<p>“I feel like it’s more natural for me to just think how I can use this tool to help me deliver content. It’s not that I don’t find good ways. Right now, my struggle is not so much about the tool but how to get good activities, whether there is a good tool or not. How to get activities that will take up the three hour time slot and actively engages them the entire time and make sure they are doing, they are <i>actually</i> doing their reading and getting them to dig in and do some difficult thinking about things they may not want to do. And so, sometimes I can find ways maybe through hearing how you use it, and hearing how others use it, and it gives me ideas.”</p>	T6: Reflection (4 connections)
Interview 2	<p>“Like I said, that is my favorite part of the week [debriefing sessions]. I think it’s really helped me to be reflective with my teaching and to see what didn’t go well and to see what is working and ways to improve it or things to keep doing that are working.”</p>	T6: Reflection
Interview 2	<p>“I think [Professor C] has wrapped her head around it [Apple configurator] more than I have and she’s way better at doing configurator than I am and I think its mere practice; like she’s done it more times than I have because the one time I tried to do it this summer it was a bomb. But she was my biggest resource in terms of like the technology part of it.”</p>	T8: Institutional Support (1 connection) <i>(T8 is included to provide an example of how institutional support impacts teaching.)</i>

The most pronounced connections to Mentoring were F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership, two areas that were heavily situated in practical applications of technology, negotiated between two or more parties. Professor B’s interactions with both colleagues and students focused on this desire to evolve her own pedagogy, resulting in the connections shown in Table 33.

Table 33

*Professor B Mentor Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Mentor	3	2	10	4	9

**Professor B: Reflection**

Reflection during the innovation process showed an impact on Professor B’s implementation of reflexive practices in class. Connections were notable to T1, Curriculum Planning, T2, Student Output Evaluation, and T4, Learner-Centered Activities. Professor B demonstrated forward thinking in her discussions, planning curricula for future classes and courses using more effective applications of the iPad. Her curriculum planning for Family Housing and Occupational Issues in Family Sciences led her to employ more reflective methods, looking back at past experiences to determine what might work best for her current course, evidenced in her discussions, classroom activities, and in my classroom observations notes.

Table 34

*Professor B Reflection Exemplars*

Source	Exemplars	Text
Interview 2	“We’ve done just little reflexive stuff. In my mind I would like to be better at that but when I sit down there are 500 other things that I’d rather write about too so I tend to not write about my teaching.”	T6: Reflection (17 connections)
Interview 2	“We rely on that technology to be dependable to archive stuff and this nice that it doesn’t take up as much physical space, but I think we have to think about the digital space.”	T6: Reflection
Interview 2	“[] when you read my Facebook posts you see what things worked really well, [] but it’s funny because if you look back that’s probably the most reflexive journaling that I get in life, these two sentence things that work really well in class or like this is an app I used that was great or this activity bombed today but they are only two second status posts.”	T6: Reflection

There were substantial connections between Reflection and all five factors. Professor B’s experiences with multiple communities had influenced her incorporation of multiple platforms to work with, allowing for creativity in output and collaboration. In the same respect, the resources she frequently referred to allowed her to assess learning and engage students in professional growth and develop a sense of digital citizenship (Table 35).

Table 35

*Professor B Reflection Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Reflection	7	10	14	15	14

## Professor C Findings

### Professor C: Overview

Professor C is a newer faculty member in the Family Sciences Department at TWU. Her background is in music and elementary education with research interests in early childhood education, education technology, play, and open-ended applications for young children. She has an in-depth understanding of appropriate uses of technology with children and she shared her knowledge to pre-service teachers and child advocates in her courses. Her diverse interests and expertise made her well suited to take on such enterprises as student iPad innovations; therefore, her agency in employing democratic tactics to innovate was visible and prudent to this research.

Table 36

#### *Professor C Democratic Tactic Connections to Texts*

Democratic Tactic	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Ownership	0	1	6	3	2	1	4	0	0	1
Context	2	5	19	14	8	11	14	0	4	9
Learner-Centered	5	6	7	17	6	12	9	0	3	8
Collaboration/Community	1	4	6	3	1	5	2	0	0	2
Mentor	0	0	0	2	3	0	0	0	0	1
Reflection	6	7	15	16	6	20	13	0	2	7

### Professor C: Ownership

Professor C's experiences with the Ownership tactic had few connections to all texts. In line with findings of Professor A and B, according to the data, infringements on ownership stemmed from management barriers and concern of

safety and security of the device and students as it was bordered by the technology infrastructure as it stood. The exemplar regarding ownership in Table 37 serves to show disconnect between this democratic tactic and texts.

Table 37

*Professor C Ownership Exemplars*

Source	Exemplar	Text
Debriefing	“We just have to provide access to things that does stuff in the cloud so they can do it there and then also do it at their home.”	T3: Multi-Modal Resourcing (3 connections)

There were less visible connections between Ownership and all factors. The minimal cross-references pertained to Professor C’s plans with the smart room that was still in the funding and infrastructure building process at the time of this study (Table 38). Debriefing sessions were saturated with conversations about management limitations and technical barriers that hindered a greater sense of ownership of student iPads. The application purchasing process, continuous clearing of student iPad histories, and iPad administrative issues such as updating iPads in time efficient ways were a few barriers to ownership.

Table 38

*Professor C Ownership Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Ownership	0	1	4	2	2

**Professor C: Context**

There were three prevalent connections between Context and T3, Curriculum Planning, T4, Learner-Centered Activities, and T7, Community & Culture. Observation data showed numerous exchanges among students for developing and presenting projects, exploring iPads applications, and reviewing age appropriate activities with and without technology that focused on literacy, numeracy, and creativity. The design of her class allowed freedom and movement that was a palpable contribution to the culture of the class. Students were familiar with class arrangements and centers, openly expressed areas they wanted to explore further, and initiated their own collaborative activities. Table 39 provides some excerpts that represent these connections.

Table 39

*Professor C Context Exemplars*

Source	Exemplars	Text
Interview 2	"But this is a different space, a different group, a different content, I'm different, different responsibilities that take time away, so I feel that the 3-year curve is figuring out what teaching is, then pay attention to the students, then third year you settle in pulling together student needs bridging that with content and curricular goals so it's more enmeshed complete whole."	T3: Curriculum Planning (19 connections)
Interview 2	"When I decided to use the iPad it was based on what the content was of the class, the activity that would help meet the course learning objectives, but also would be practical. So having students create activities around the TEKS because they'll need to do that as teachers. Their whole life is about to revolve around the TEKS."	T3: Curriculum Planning

Interview 2	“Open-ended ways and not just worksheets so that’s why we do the hands on activities, center-based so they can explore. Even then I try to include digital and non-digital areas. And I don’t require any center. They can choose. Then debrief. What did you do? Talk it out. Avoided?”	T4: Learner-Centered Activities (14 connections)
Debriefing	“And that depends on where they are in the workforce. If they are in the hospital where somebody started the technology and everybody uses it. It could totally depend on their location too.”	T7: Community & Culture (14 connections)
Debriefing	“I’m totally intrigued by this idea of talking to our students about their technology. Like where they are. Their perception of where technology needs to be for them as a professional. For our students, for the family sciences students.”	T10: Differentiation (9 connections)
Interview 2	“I want lecture to be more toward the beginning and then the end of class when everyone is tired, we collaborate or walk around.”	T5: Multi-Modal Resourcing (8 connections)

There were substantial connections between Context and all factors, most predominantly to F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership. The content of the course, Foundations in Early Childhood Education, was an undergraduate core class that covered the fundamentals of education and development of young children. This entailed many elements that were contextual in nature such as theory, school mission statements, age appropriate practices, classroom materials, classroom designs, state mandated standardized tests, state learning goals (TEKS), family communication systems, assessment strategies, and so forth. These topics were geared toward developing pre-service teacher skills so they could better meet needs and demands of contemporary early childhood classrooms.

Table 40

*Professor C Context Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Context	18	15	30	18	24

**Professor C: Learner-Centered**

The connections to the Learner-Centered tactic varied. Most substantial were to T4, Learner-Centered Activities, and T6, Reflection. Professor C’s classroom activities involved many open-ended exercises exploring the iPads and applications, both independently and in small groups. Students’ freedom to choose between centers, presentation platforms, and tools to mediate their learning was apparent and touched upon many facets of digital age pedagogy of early childhood classrooms. Examples include literacy, numeracy, problem-solving, fine and gross motor development, 1:1 correspondence, hand-eye coordination, and seriation activities. Professor C’s reflective and constructivist approach encouraged students to explore and evaluate their learning, which also modeled how to disseminate such strategies for future classroom practices. This was further evidenced by post-activity discussions and reflections about the purpose of such activities as well as how they satisfied state requirements such as TEKS or other curricular mandates.

Table 41

*Professor C Learner-Centered Exemplars*

<b>Source</b>	<b>Exemplar</b>	<b>Text</b>
Debriefing	“I remember saying last semester in our interview that I felt pressure that I had to cover a certain amount of content and that because of feeling like some students like [...] cover[ing] content through exploration, but you have to spend a lot more time naming it and explaining what they’re doing because if you just expect them to understand while they are exploring and experimenting, they are also learning content.”	T4: Learner-Centered Activities (17 connections)
Debriefing	“I was doing groups with math concepts so I had centers all over the room with iPads as one with close-ended math apps. It was interesting to hear what they had to say about that.”	T4: Learner-Centered Activities
Debriefing	“Our students, the family science students, child development, early childhood educators, they are not of that digital generation of the students that they will be influencing and working with. And so, that’s a piece we have to be concerned about, helping them bridge their gaps of knowledge in that digital world. The children will. The families will.”	T6: Reflection (12 connections)
Reflection	“In the play class I’ve designed, I’m in a new situation where I only have 28 students, but when I taught this class in the past I had 150-200 students. I’m still trying to figure out how to do less lecturing and more hands-on activities, now that the class has a much smaller number and we have access to tech resources like iPads that each and every students can use. So I’m trying to figure out how to do more constructivist and socio-constructivist learning experiences in general - not to mention how to incorporate technology as a supportive tool for that.”	T7: Community and Culture (9 connections)

The Learner-Centered democratic tactic of innovating with student iPads had a direct influence on many teaching texts and, thus, on all factors with particularly notable connections to F1, Facilitate Student Learning and Creativity, F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership. Professor C’s classroom activities employed student agency for developing better understandings of child appropriate materials and practices, including digitally mediated ones. By transferring the knowledge she gained by exploring areas that interested her, particularly play, she manifested a paradigm and culture that was heavily learner-centered in her classrooms.

Table 42

*Professor C Learner-Centered Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Learner-Centered	19	13	15	10	16

**Professor C: Collaboration/Community**

There were less obvious connections between Collaboration/Community and texts. T3, Curriculum Planning, was moderately connected to this tactic, based primarily on Professor C seeking ideas for future lessons using technology, both within and outside of the innovation project team.

Table 43

*Professor C Collaboration/Community Exemplars*

Source	Exemplars	Text
Interview 2	<p>“I didn’t really seek ‘advice’ but rather ‘ideas’...I got from [Professor A and B] while talking in our weekly meetings. I also got ideas from looking up research to support our upcoming presentation [NAEYC conference and expo]. I also am on Twitter and follow a lot of tech folks (among other educational and academic folks) so I sometimes learned things there. I also talked to my spouse who works in a district with one-to-one iPads, and I followed some of that district’s online presentations. I am also a member of Children’s Technology Review and get emails periodically from them reviewing apps, so I got a few ideas from them.”</p>	<p>T3: Curriculum Planning (6 connections)</p>
Reflection	<p>“When I worked with young children I used my iPad to record student work that I could then easily carry and share with parents. I also worked with a group of researchers at [university] who were developing a means of using tablets to collect formative assessments [...]. I would like to do something like that to assess college students too, but I haven’t figured out how to make that a part of my teaching yet.”</p>	<p>T3: Curriculum Planning</p>
Reflection	<p>“I don’t think I use the iPad for building leadership skills and community at this moment in time. I usually have students use them to explore apps and activities they can use with children to foster play, creativity, and exploration, but I don’t use them well for getting things done as a student.</p>	<p>T7: Community &amp; Culture (4 connections)</p>

Collaboration/Community was connected to F3, Model Digital Age Work and Learning, F4, Promote Digital Citizenship and Responsibility, and F5, Engage in

Professional Growth and Leadership. In reviewing the cross-references, connections regularly tied iPad applications and activities in class to professional development within the context of pre-service teachers educating or advocating for young children using research supported tools.

Table 44

*Professor C Collaboration/Community Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Collaboration Community	5	4	13	8	8

**Professor C: Mentor.** Professor C’s mentoring experiences innovating with student iPads showed relatively little connection to texts. Similar to the Collaboration/Community tactic, there was a slight connection to T3, Curriculum Planning. These cross-references mirrored those findings as they pertained to seeking resources in the form of new ideas from multiple sources that fostered professional development for pre-service teachers and child advocates. Data such as these prompted the need to expand the definition of mentoring to include *seeking* mentoring. By doing so I was better able to address varied experiences with mentoring and support. Professor C provided mentoring in regard to ECE apps, peer sharing apps, technical assistance with the iPad configurator, and research tools for analysis for their grounded research. She received mentoring from Professors A and B as they had more years of experience teaching in higher education classrooms.

Finally, she sought mentoring to gain ideas on how to keep students engaged for future classes.

Table 45

*Professor C Mentor Exemplars*

<b>Source</b>	<b>Exemplars</b>	<b>Text</b>
Interview 2	“I always will need support of some kind. I’m interpreting ‘support’ to mean tools - in the Vygotskian sense, that can deepen my academic concepts around content as well as delivery.” [seeking mentoring]	T3: Curriculum Planning (6 connections)
Reflection	“I don’t take the time to do it [design activities for outside the class using iPads due to access]. But what I need is ideas of how to use them in meaningful ways.” [seeking mentoring]	T3: Curriculum Planning
Reflection	“One problem-solving activity I have in my play class is for students to observe children engaged in free-play activities, taking notes of their actions and talk, and then selecting a theorist that we have learned about in class to analyze that play. This is like a little mini research project wherein students must apply information to a real-life situation and then write about the experience and their responses to it.” [providing mentoring]	T6: Reflection (5 connections)

The most vigorous connections to Mentoring were F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership (Table 46). By incorporating elements of mentoring by way of helping students develop professional skills in early childhood dynamics, Professor C was inadvertently mentoring her students because her activities were practically situated. Further, her consistent use of iPad apps for students to explore for future uses with children was

the praxis of digital age learning that also had very practical applications for pre-service teachers.

Table 46

*Professor C Mentor Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Mentor	5	3	9	3	10

**Professor C: Reflection**

Reflection during Professor C’s innovation process had a wider range of connections to T3, Curriculum Planning, T4, Learner-Centered Activities, T6, Reflection, and T7, Community & Culture. Cross-references contained many questions as Professor C spoke. She was very reflective and reflexive in her speech, demonstrating a continuous exploration of how to improve teaching practices in her Early Childhood courses, and why improving practices would benefit future teachers and advocates of young children. Her negotiation of best practices with student iPads in class was dialogic in nature and reflected her shifting paradigm of enhancing content by incorporating technology mediated activities.

Table 47

*Professor C Reflection Exemplars*

<b>Source</b>	<b>Exemplars</b>	<b>Text</b>
Debriefing	"I mean, why did I do that [a Kahoot activity]? There were specific reasons why I made all of my choices. So, let's talk it out. What happened when you did this? What happened when everyone could see their scores? Right? Like, what did that do to the class? What did it do to your feelings as a student? What did it do to your feelings as a teacher? And then talk out that process of 'Well, how DO we make those choices?' Maybe sometimes you DO want to have that competition and that quick response."	T6: Reflection (20 connections)
Debriefing	"It's tricky to figure out what is going to be this person's motivational key. Because, the 'be a professional' may work for some people and then there might be other people who are like "you are going to have to give me more than that." Right?"	T6: Reflection
Debriefing	"I mentioned before that I tried to bring a lot more with a lot more variety [centers]. See if there is something you might find interesting over there. I don't know if works but whenever they say things like 'I hate this,' I wonder, 'How can I invite you to like this because I love it?'"	T6: Reflection
Reflection	"I promoted reflection of learning by having students answer reflective questions in class (on paper and sometimes through SeeSaw app). The types of reflective questions I asked varied from class to class."	T6: Reflection
Debriefing	"I'm trying to learn how to do more student driven activities, exploration, um, I don't know if research is the best word because it's not that high level so I'm thinking of ways to give them activities so it's less of me talking and more of them doing."	T4: Learner-Centered Activities (16 connections)
Interview 2	"I included in-class group work that sometimes incorporated iPads to foster socio-cultural learning experiences and I also included group projects (with some portions conducted in class and some outside of class time)."	T7: Community and Culture (13 connections)

Interview 2	“I always like hearing what the other 2 professors share, and thinking about how my own perspectives are similar or different (sometimes I agree, sometimes I don't, and sometimes I need time to think about it). I always like hearing their ideas as well as their happy moments and frustrating ones. Sometimes I like sharing, and sometimes I like being quiet so I can think about their experiences.”	T7: Community and Culture
Interview 2	“I do have some things, like the Seesaw app that allows anyone to go back to see what kinds of info was given. It doesn't have to only happen at that moment in class, I can go back and evaluate later, but that's something I need to work on that. Not just with the iPad but in general ...some ways I do that are student responses and following instructions, so how did I play a role in that in not giving them the kind of support they needed, but there is choice. They are individuals. They make choices of what they do and don't do. I talked to my husband about this...the student is in charge of themselves and you can do great things but they still have choices. I feel like I'm still trying to figure this out how this works, like a new teacher again even though I taught elementary school for 16 years.”	T3: Curriculum Planning (15 connections)

There were also many connections between Reflection and each factor, with particular emphasis on F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership (Table 48). Professor C employed a multitude of iPad applications in conjunction with traditional teaching practices that fostered professional development of pre-service teachers within the scope of age appropriate practices. She provided multiple research-based resources for students to review and incorporate into their classroom explorations and projects while always impressing the importance of adhering to the TEKS. The activities observed

in her class had embedded technical and traditional qualities that were open-ended, allowing student driven inquiry.

Table 48

*Professor C Reflection Connections to Factors*

Democratic Tactic	F1 Student learning & creativity	F2 Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
Reflection	12	14	19	18	19

**Connections Between Democratic Tactics for Innovating and Teaching  
Texts/Factors**

Matrix coding within NVIVO showed a connection of democratic experiences of the three educators innovating with student iPads to their teaching practices. These teaching practices, or texts, were dually coded into the NETS-T factors, again, demonstrating connections between them. These vital connections provided a way to examine how innovation could take place through democratic experiences of educators, serving as change agents in a bottom up dynamic of pedagogical shifts with student iPads.

Experiences of Professors A, B, and C varied, with diverse combinations of strong and weak connections (Democracy to Texts and Texts to Factors), highlighting the contextual nature of technology integration in higher education.

Table 49 below shows the combined connections that provide a broader perspective

on how democratic experiences connected to texts and the categorization of these texts that make this method pliable to communities attempting a bottom up innovation with student iPads in diverse settings. Although cross-references are plentiful across the board, highlighted cross-sections illustrate what areas the three professors dialogues were most heavily focused.

Table 49

*Aggregated Findings of Professor's Democratic Tactic Connections to Texts*

Democratic Tactic	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
<del>Ownership</del>	<del>0</del>	<del>0</del>	<del>0</del>	<del>2</del>	<del>3</del>	<del>0</del>	<del>0</del>	<del>0</del>	<del>0</del>	<del>1</del>
Context	5	9	29	22	10	16	20	0	5	13
Learner-Centered	10	9	11	26	9	16	13	0	4	11
Collaboration Community	2	3	12	6	7	3	7	1	0	2
Mentor	4	4	10	9	6	15	10	1	0	3
Reflection	9	8	18	18	7	29	15	0	2	8

### Ownership

Ownership is shown above with a strikethrough, indicating a *disconnection* to all democratic tactics in the overview of Professors A, B, and C's experiences using student iPads. Although there are cross-references found intermittently, as seen in T4, T5, and T10, they referred to ownership of other devices, such as smartphones, or the *lack* of freedom to perform functions with the iPads that provided access and fluidity. This absence of ownership was common among all three professors despite their specialties.

The common absence of ownership experiences while innovating with student iPads limited what professors and students could do with the iPads, such as download apps or personalize the device itself. This finding was in line with the literature by Kearney and Maher (2013) that personalization fostered agency, therefore, lack of ownership marginalized their agency to some degree. Considering the theoretical underpinning of democracy in this study, lack of ownership and the affordances that come with freedom to choose and customize according to individual wants and needs is in opposition to its fruition in this regard.

### **Context**

Context was most notably connected to T3, Curriculum Planning. Professors A, B, and C regularly referred to considerations of the context of their courses when they planned activities with student iPads, as well as the diversity of their student populations. Diversity among the students had included digital access, technical abilities, and professional endeavors.

A key finding here was the impact of context on a broader scale. Professors A and C were ECDE instructors while Professor B taught FCS courses, but all were heavily engaged in contextual discourse. Though not always related to the same topic, there was a general understanding and application of context to teaching practices focused on making student iPads tools to enhance learning course content.

### **Learner-Centered**

The data illuminated professors' Learner-Centered experiences that influenced implementation of learner-centered activities in classrooms with student

iPads. Discussions among professors frequently addressed the exploration of iPad applications to meet their own individual interests and needs. For example, exploring various attendance apps to improve workflow, or exploring web based applications to gamify instruction. These activities transferred over to how professors attended to the interests, skills, and needs of their students, such as exploring different platforms to develop portfolios. Before professors adopted an innovative activity with iPads, they adapted them, which was more easily accomplished when built upon what was known (Dooley, 1999).

### **Collaboration/Community**

The most prevalent connection to Collaboration/Community was T3, Curriculum Planning, but with the lowest number of cross-references in relation to texts overall. Professors A, B, and C employed various collaboration strategies in their classes, some of which were inspired by what they had discussed in their weekly debriefing sessions. Successes and failures were shared in those sessions that proved to be valuable assets for time and effort efficiency for the other professors. Extensions of their self-prescribed community were typically outside of the Family Sciences Department, thus, providing diverse insights on how to plan activities using student iPads in their classrooms. Collaboration/Community experiences may not have influenced teaching practices directly, but rather, they became an avenue for other democratic tactics, such as reflection. Collaborative efforts among the professors within the same department fostered a goal-oriented

community that provided support for one another in their individual and collective enterprise to innovate with student iPads.

### **Mentor**

Mentoring was connected most notably to T6, Reflection. Mentoring was initially defined, for the purposes of this study, as mentoring among the three professors. As more data were collected, transcribed, and analyzed the definition evolved to include mentoring students and students mentoring one another.

Further, it grew to include providing mentoring and desiring mentoring. Given the technical expertise of each professor, there was not much in the way of mentoring technical aspects but, rather, inspiration gained from one another in how to improve pedagogy based on the experiences they were sharing with one another. Instead of finding answers to all of their questions, their work together posed more questions, many times in regard to the appropriateness of iPads all together within certain contexts. For example, reflection was primarily executed in a traditional paper and pencil fashion since students did not prefer iPad keyboards for writing.

Professor A contributed to the discourse on early childhood pedagogy, application of theory in early childhood classrooms, and step-by-step implementation tactics with diverse students. Professor B offered many ideas of web based platforms conducive to learning and gamification strategies. Professor C supported efforts and goals with research based practices. She also had a grounded research paradigm that allowed for the tangent experiences and data to emerge, and then merge. Collectively the three professors contributed to areas of interest and

expertise to a supportive community with like-goals for the Family Sciences Department. This web of support was influential to their innovation process because it engaged them in reflexive consideration of iPad uses for ECDE and FCS courses.

### **Reflection**

There were many connections between Reflection and reflective/reflexive teaching practices with the highest number of cross-references to texts than any other democratic tactic overall. Reflection included responses to the reflexive journal prompts (Appendix D) as well as references about thoughts, ideas, negotiations, and reconfigurations of teaching practices for future ECDE and FCS classes. Statements about the importance of students understanding the purpose behind classroom activities with young children and families were considered reflexive because they prompted the question, *Why is that important?*

The distinction between reflection and reflexive though emerged as the data warranted because what was taking place between professors and students did not fall under one dynamic. As I analyzed data using the reflection lens, it became apparent that professors were doing more than recalling past experiences; they were examining why they needed to adjust teaching practices in response to student needs or course content. This introspective look made contextually driven practices more visible.

Although Professors A, B, and C were not necessarily systematic in their reflective practices, they were reliably reflexive in their conversations and lectures.

They searched for ways to convey the importance of purposeful practices with children and families, and encouraged students to think critically about education approaches.

At times teaching practice decisions were made on behalf of a more streamlined system, or improved workflow, such as assigning an iPad manager to distribute and collect student iPads. Other times changes were due to technical barriers such as limited bandwidth or firewalls. Most notable were pedagogical shifts in response to pressures to cover all of the course content or enhance key learning objectives. These negotiations were intimate disclosures, particularly in regard to helping students who needed more support. Here was where negotiations were at their highest. Should certain practices be aborted? Are they altered somehow? Are there new ways of accomplishing these goals? The heterodialogic aspects of these negotiations were the crux of this research and evidenced in the reflexive discourse among the professors.

### **Text Connections to NETS-T Factors**

Table 50 shows all cross-references of texts and factors. The purpose of making these connections was to succinctly categorize specific teaching practices into a broader scope in the education field. NETS-T standards were the broader categories and performance indicators developed by the International Society for Technology in Education (2002). They provide educators a guide for developing skills and competencies to use technology in K-12 classrooms. These findings were integral to the following sections and laid the foundation for inquiring about student

opinions of learning experiences with student iPads. Management (originally labeled Institutional Support), T8, and Classroom Rules, T9, had weak connections across all factors and were not represented within the factors, but will be addressed in the Chapter V discussion.

Table 50

*Teaching Text Connections to NETS-T Factor Categories*

Texts > Factors	F1 Student learning & creativity	F2 Design Digital age learning & assessment	F3 Model Digital Age work & learning	F4 Promote digital citizenship & responsibility	F5 Engage in professional growth & leadership
T1 Classroom Activity Evaluation	19	9	17	13	15
T2 Student Output Evaluation	23	18	19	12	14
T3 Curriculum Planning	20	26	30	25	31
T4 Learner-Centered Activities	36	34	34	28	40
T5 Multi-Modal Resourcing	21	16	37	26	37
T6 Reflection	26	30	31	29	43
T7 Community & Culture	34	20	35	28	38
T8 Institutional Support	0	0	0	0	1
T9 Classroom Rules	3	2	4	6	2
T10 Differentiation	15	14	12	10	17

Texts fell under the factors they had consistent connections/cross-references to. This was determined in my analysis of data for Research Question One in two ways. First, texts that are not highlighted in Table 50 did share connections, but when disseminated by the differences between numbers relative to other differences between numbers within the same row, I omitted any that were not consistent. For example, in the T1 row, all numbers are a difference of two except

for F2 (column 2), which is a difference of six. Second, I had to use hermeneutic contextualism to determine each cross-reference's contextual connectedness. The nature of this qualitative inquiry allows my interpretation of each datum, making it subjective for this portion of the analysis and a delimitation of this study. For example, the T7/F2 box is not highlighted, not only because that difference was greater but because assessment was not a primary focus in dialogues of the professors. Overall, the analysis illustrated that NETS-T was a suitable categorization system based on the high number of connections throughout. Table 51 is a quick reference for all texts that fell within each factor as per substantial cross-references in the analysis.

Table 51

*Reference Guide for Texts that Fall Under Each NETS-T Factor*

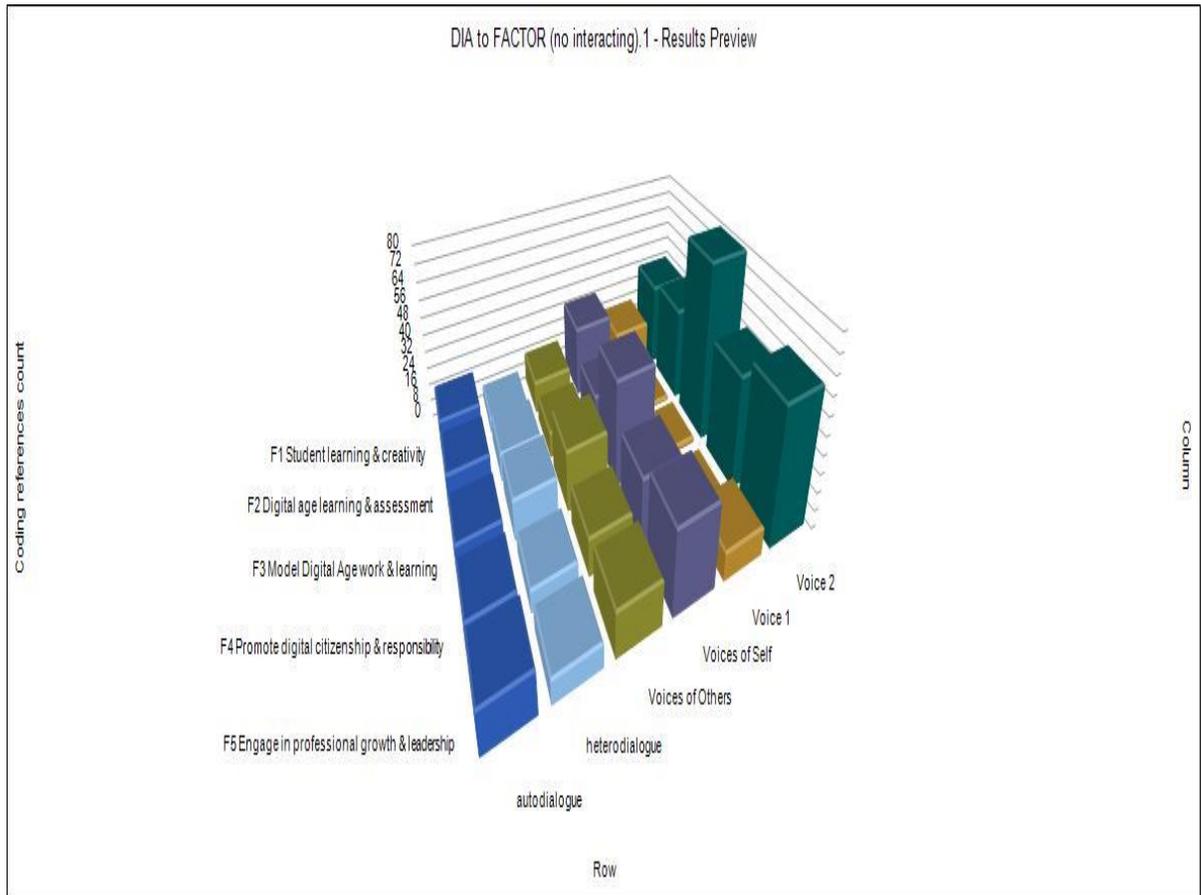
F1 Facilitate Student Learning and Creativity	T1,T2,T3,T4,T5,T6,T7,T10
F2 Design Digital Age Learning and Assessment	T3,T2,T4,T6,T10
F3 Model Digital Age Work and Learning	T1,T2,T3,T4,T5,T6,T7,T10
F4 Promote digital Citizenship and Responsibility	T1, T3,T4,T5,T6,T7,T10
F5 Engage in Professional Growth and Leadership	T1,T3,T4,T5,T6,T7,T10

**Section Two: Findings for Research Question Two**

How did educators' dialogic experiences exploring the use of student iPads for Early Childhood Development and Education and Family Studies courses influence the process of integrating iPads into their teaching?

The nature of qualitative research relies heavily on relationships and interactions. This analysis strategy best fit the purpose of Research Question Two to explore dialogic voices and relations among educators who made negotiations that led to changing practices with iPads more visible. Recalling from previous chapters, dialogic voice refers to an individual's position on a text within a dialogue, and dialogic relation referred to traditional or tech-in-hand classroom dynamics.

The data used to answer Research Question Two were interviews 1 and 2, debriefing sessions, and professors' five reflexive journal entries. Researcher data was not included in this portion so as to isolate the voices of Professors A, B, and C. In essence, this question placed a dialogic lens on the combined experiences of Professors A, B, and C, specific to texts and factors. Figure 1 is a graphic representation of cross-references, or connections of factors to dialogic voices and to dialogic relations. There was a clear predominance of Voice of Self and Voice 2 attributed to the amount of discussions in first person about and presence of student iPads in her classroom. Voice 1, autodialogue, and heterodialogue were minimal in comparison, which highlights the influence of iPad variations and collaborative innovating processes. Connections to Voice of Other were relatively strong, further corroborating this elucidation about the influence of collaboration on innovation among educators in democratic dynamics.



Note. Generated and exported from NVIVO, 2015.

Figure 1. NETS-T Factor Connections to Dialogic Voices and Dialogic Relations

### Factor 1: Facilitate Student Learning and Creativity

Factor 1, Facilitate Student Learning and Creativity, was most heavily negotiated through Voice of Self/Autodialogue, and relation had a slight shift from Voice 1 to Voice 2, relative to all other factors. F1 reflected professors' assertions in reflections and in debriefing sessions about their agendas or strategies regarding curriculum planning for promoting creativity in learning activities in class, with internal juxtapositions being the primary agent for decision-making. In essence, professors began with ideas of iPad uses for their classes, and after some

introspection, they maintained some traditional practices as well as trialed some digitally mediated practices to achieve learning objectives. Table 52 provides a descriptive language sample of dialogism as it pertained to F1 and voice of self/autodialogue.

Table 52

*Factor One Connections to Voice of Self/Autodialogue and Voice 1 Exemplar*

Source/Nodes	F1: Voice of Self/Autodialogue
Debriefing Voice of Self/ Autodialogue Voice 1	"But I also decided to find a book that I could share with the class, so that was the first thing I did. The kind of sharing that you would want them to do with young children. Interactive. Not just me telling you and you sitting there listening. I asked questions like, 'what do you think is going to happen next?', pulling them in . And after that was over I went over to the social studies concepts and said ' these are the different ways, like cooperation, democratic values, different aspects of social studies education.' I said 'Where did you see examples of this in the text?' I don't know if that had any affect at all, but there were more people at the books this time."

**Factor 2: Design Digital Age Learning and Assessment**

Factor 2, Design Digital Age Learning and Assessment, was most heavily associated with Voice of Self/Autodialogue and had a major relation shift from Voice 1 to Voice 2. This means the professors shifted their teaching practices away from traditional dynamics and toward tech-in-hand dynamics when discussing or designing assessment strategies.

The majority of statements categorized into F2 reflected assertions of what individual professors did with student iPads that related to content about assessment strategies for their own learning as well as with children in future

classroom settings. Connections to voice of self implied assertions with no inference to change practices. This may be due to the specific content, or to the nature of classroom activities. Examples include hand written journaling, movement games, and traditional, non-digital, materials provided to students. Internal juxtapositions were the primary catalysts of shifts toward exercising more technology-mediated teaching practices. This demonstrates the influence of new experiences on previous notions about iPad affordances, such as using digital productivity apps and platforms to prompt creativity. The relation shift to Voice 2 showed that, overwhelmingly, the three professors acted on their juxtapositions, changing teaching practices because of the technology integration into their courses (Table 53). Although varied and still very contextual, as a whole, the professors' shift was visible.

Table 53

*Factor Two Connections to Voice of Self/Autodialogue and Voice 2 Exemplar*

<b>Source/Nodes</b>	<b>F2: Voice of Self/Autodialogue</b>
Reflexive Journal  Voice of Self/ Autodialogue  Voice 2	"I feel comfortable using digital tools in my everyday life (e.g., computers, cell-phones, iPads, online tools, etc.). For instructional purposes I most often use my computer to design lecture support materials, communicate with students (via email and on blackboard, though I also am using blackboard collaborate to conduct webinars for the first time this semester). I was very glad to get Google tools to use with students and have used them to organize sign-up sheets for various student activities, to house documents outside of blackboard, and to organize collaborative work with students and other professors (e.g., Google docs). I use my iPad to demonstrate concepts and have been excited to incorporate the iPad cart into activities."

### Factor 3: Model Digital Age Work and Learning

Factor 3, Model Digital Age Work and Learning, was heavily negotiated through Voice of Self and Voice of Others, with the most drastic relation shift from Voice 1 to Voice 2 than all other factors (three Voice 1 connections to 80 Voice 2 connections). The majority of statements categorized under F3 were assertions of self in conjunction with assertions of others in relation to modeling digital age pedagogy. Others within this context included colleagues' and students' direct quotes, indirect quotes, and echoes. The dialogic relation shift from Voice 1 to Voice 2 was, therefore, partially attributed to the collaborative efforts and community dynamics within classrooms that led to change in teaching practices. Examples include gamification strategies, child-friendly apps for literacy and numeracy development, and Internet sourcing. Table 54 contains exemplars of both voices 1 and 2 as well as shifting relations.

Table 54

#### *Factor Three Connections to Voice of Self, Voice of Others, and Voice 2 Exemplars*

Source/Nodes	F3: Voice of Self/Voice of Others
Debriefing Voice of Self Voice of Others Voice 1 Voice 2	“‘Oh, I was supposed to bring my book? I left my book in my house!’ and I was like, ‘Well, get an iPad and find it so you can...and we’ll just plug it up so you can show it to us that way’.”
Debriefing Voice of Self Voice 2	“Sometimes I have a specific thing, like we did center-based activities for dramatic play centers and so I included some centers that had specific apps I wanted them to explore - so like, puppet shows, and little cartoon creations and things like that, because it’s a type of dramatic play.”

#### **Factor 4: Promote Digital Citizenship and Responsibility**

Factor 4, Promote Digital Citizenship and Responsibility, was heavily negotiated through Voice of Self and Voice of Others, with a dramatic relation shift from Voice 1 to Voice 2 (1 to 50 cross-references). The majority of statements categorized under F3 asserted positions of self in conjunction with positions of others, therefore, teaching practices changed partially due to the reflexive nature of their collaborative exploration of student iPads and partially due to the more explicit exchanges among them.

Factor 4 did not have an overall connection to texts relative to other factors, which was partially due to infrastructure limitations such as firewalls and due to pedagogical agendas. Utilizing hermeneutic contextualism, I saw that much of the focus was on exploration rather than establishment within digital spaces, a major discussion point of this research that will be addressed in Chapter V. What this means is that the time allotted for iPads was designed to explore the iPads rather than build content or embed students into the digital realm. Although there were productivity activities, such as student developing presentations and websites, the discourse among professors and activities with students reflected goals to discover sound educational practices with students aspiring to teach and advocate for children and families. Table 55 provides samples of language as they pertained to factors, voices, and dialogic relations because they refer to teaching practices, dialogic positions of those teaching practices, and the dynamics in which they are planning on implementing student iPads in their ECDE and FCS courses.

Table 55

*Factor Four Connections to Voice of Self, Voice of Others, and Voice 2 Exemplars*

<b>Source/Nodes</b>	<b>F4: Voice of Self/Voice of Others</b>
Debriefing Voice of Self Voice of Others Voice 2	Prof. B: "I had a student who self assigned herself to be manager." Prof. A: That's smart. Maybe we need a manager. Prof. B: She was like, "This will be easier if I just facilitates this so they all just hand her the iPads and she plugs them all in, but if she's not there that day then no one does it." [...]                     Prof. A: I don't know if I could ask someone to be the manager. I could ask for volunteers, obviously, but...you never know."
Debriefing Voice of Others Voice 2	"So you know what's going to be an issue with people coming in our classroom [the smart classroom project] and not knowing how to use those boards, which they could learn, and that's another issue, support for that."

**Factor 5: Engage in Professional Growth and Leadership**

Factor 5, Engage in Professional Growth and Leadership, was negotiated through Voice of Self/Autodialogue and Voice of Others, with a clear relation shift from Voice 1 to Voice 2 (13 to 60 cross-references). The majority of statements categorized under F5 reflected assertions of self with internal juxtapositions in conjunction with assertions made by others, and that these negotiations led to change in teaching practices with student iPads.

The connections to F5 were especially notable for two reasons. First, it exposed the priority of professors to develop students' professional repertoires through activities they chose with the iPads. The developing theory behind this

motivation was that iPads were not the focus of learning but, rather, the tool for learning and working with young children in globalizing environments.

The second notable aspect of this finding was the difference of the focus of professional development agendas between the ECDE and FCS professors. The excerpts of cross-references from ECDE instructors, Professors A and C, addressed appropriate practices while Professor B addressed practical applications with iPads. In FCS courses students built portfolios to present to future employers, explored household management strategies and resourcing, reviewed demographic considerations when assisting families with housing, and searched job options for those earning a degree in Family and Consumer Sciences. In ECDE courses, students reconnoitered various age appropriate iPad applications, open-ended web based sites to develop literacy, numeracy, and creativity, and ways to share information that are secure and immediate. They also negotiated frequently about what “best practices” were, why they were considered best, and who said they were best. They discussed reliable sources from which to support their practices and ideas with children, and with critical eyes, what the purposes are for each of their actions, plans, and assessments in their future teaching and advocating endeavors. Table 56 illustrates these dialogic juxtapositions in relation to professors’ shifting texts.

Table 56

*Factor Five Connections to Voice of Self/Autodialogue, Voice of Other, and Voice 2*

Source/Nodes	F5: Voice of Self/Voice of Others
Debriefing Voice of Self Autodialogue Voice 2	“Well, last time I remember being like ‘why don’t they help each other?’ This time I have to be more intentional after about the third time. Part of the reason we are using these iPads is so we can become problem solvers and use technology to show you how to use technology in your future.”
Debriefing Voices of Others Voice 2	Prof. C: “I did notice that some students once they knew, [...] I had several students go, ‘Where did you get these? I want to get one.’ Like it’s opened their eyes to how they want to facilitate their own personal tech.  Prof. A: Aw, that’s good. Cause then [it] becomes like a mini-computer.  Prof. C: They were like, “Oh, I want one of these, where did you get it? Did you just...  Prof. A: Show them yours... I really want one of those!”

**Synthesis of Dialogic Voices and Relations**

Most autodialogue juxtapositions referred to curriculum planning and contextualizing uses of student iPads for their courses. Negotiations in discourse among two or more faculty members, heterodialogue, were mainly reflections of teaching practices, both successful and still in the formation stage, within the contexts of their courses. Statements made about one’s own teaching practices, or voice of self, reflected insights that were not necessarily under reconsideration nor juxtaposed. For example, Professor A stated that content will always be prioritized over technology, therefore, her position on that topic is not juxtaposed, as she is

unwavering in her assertion. Assertions that were not reconsidered surfaced as past experiences with personal and/or student iPads and learning goals determined at the beginning of semesters that were minimally flexible. Direct, indirect quotes, echoes, and voice of others were linked to student output evaluation strategies and developing classroom rules or norms.

Dialogism as a lens of tablet integration in Early Childhood and Family courses helped to visualize the collaborative process. Isolating dialogic voices allowed a view into complex and personal change processes of teaching practices. In addition, capturing voices in the language allowed me to gain a perspective on individual strengths, weaknesses, and influential dialogues about student iPads for ECDE and FCS courses. The dialogic lenses layered into the theoretical framework of this study apply to diverse populations in diverse educational settings because they are premised on context, collaboration, and human agency, which are universal components of any school or culture. The efficiency of dialogism to elicit data as it pertained to connecting professor's experiences and teaching practices will be discussed further in Chapter V.

### **Section Three: Findings for Research Question Three**

What impressions do students enrolled in Early Childhood Development and Education (ECDE) and Family and Consumer Sciences (FCS) courses have about teaching practices with newly acquired student iPads, and do they reflect a culture of innovation?

Research Question Three introduced student perspectives on using student iPads as they pertained to their professor's connections between experiences

innovating and subsequent teaching practices. Students from each professor's Fall 2015 course formed three individual focus groups to discuss with me their thoughts and opinions of iPad uses. In tandem, they provided suggestions for improving practices for future courses and for practical applicability to their future careers as educators and human service practitioners.

### **Focus Group Discussion Design, Part One**

Democratic tactics were explained to focus groups as experiences of their professors during their own exploration of iPad functions, benefits, and barriers. Factors were described as categories of teaching practices of which examples of specific classroom activities, recited from classroom observations, contextualized them. Students were first asked if they agreed or disagreed with the presence of that factor during the semester. Consensus and close margins were recorded in the tally sheet for analysis and member checking purposes (Appendix R). Below, Figure 2 shows a Word Frequency Analysis generated within NVIVO, illustrating the dominant words spoken during the focus group discussions by font size, compiled as a whole from all three groups' discussions.

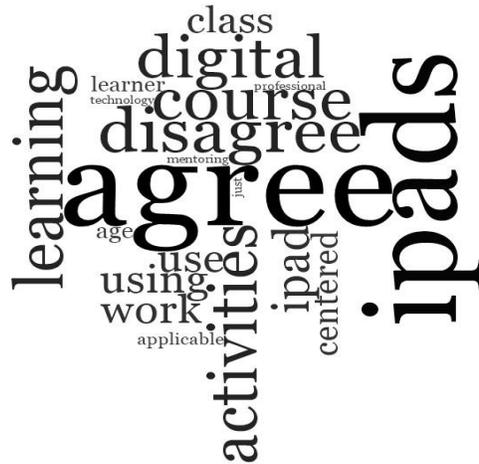


Figure 2. Word frequency of focus group data

The dominant word was “agree”, meaning that the majority of students agreed that elements of those teaching categories, or factors, explained to them were present in their courses. Some focus groups disagreed to the presence of a factor and, therefore, it can be seen here at a lower level of frequency by the smaller font size. The purpose behind this preliminary analysis was to confirm that the NETS-T factors were suitable categorizations of teaching practices as per the students. It also provided a qualitative visual of students’ overall perspective on shifting pedagogies using student iPads in ECDE and FCS courses.

### **Focus Group Discussion Design, Part Two**

After a professor’s tactic/factor connection was presented, students stated their opinion by a show of hands of the pair as *innovative, neutral, or not innovative*. Consensus, again, determined the outcome of that tactic/factor pair. Open-ended discussions and suggestions at the end of each line of questioning were transcribed, and then coded into a priori *Factors* node and a posteriori *Suggestions* node that

emerged from focus group discussions. Suggestions included *Classroom Management, Consistency, Differentiation, Grouping and Collaborating, Learning the Device, Practical Applications, Resourcing, Technical Difficulties, Time, and Variety.*

Table 57 shows student consensus of the innovativeness of teaching practice categories with iPads. The purpose of these three being combined in the analysis is to provide a complete picture of the discussions and reactions of students that lay the foundation for a culture of innovation developing in the Family Sciences Department at TWU. Of utmost importance to this study, and will be discussed in Chapter V, were findings that student opinions of Factors 1, 3, and 5 being *innovative* practices aligned perfectly with findings of prevalent connections between democratic and dialogic experiences of professors to Factors 1, 3, and 5.

Table 57

*Focus Group Data Connections of Factors to Innovativeness*

<b>Factor</b>	<b>Innovative</b>	<b>Neutral</b>	<b>Not innovative</b>
F1 Facilitate Student Learning and Creativity	5	0	1
F2 Develop Digital-Age Learning & Assessment	2	4	2
F3 Model Digital Age Work & Learning	7	1	1
F4 Promote Digital Citizenship & Responsibility	2	1	5
F5 Engage in Professional Growth and Leadership	8	2	1

### **Focus Groups Feedback on Factor 1**

The strongest connection to Context and Learner-Centered democratic tactics from Research Question One findings was Factor 1 (F1), Student Learning and Creativity. This finding represented a multitude of connections of texts to F1, indicating regular exercise of teaching practices associated with this factor. F1 results had a consensus opinion of being innovative among students using iPads during the Fall 2015 semester. Suggestions centered on more variety of platforms and applications to diversify classroom activities befitting the course content. They also included differentiating by means of increasing collaboration between more tech savvy students and those still acclimating to tablet technologies in learner-centered fashions. Their recommendation for an “urgent care corner” on a regular basis substantiated students’ desire to advance their understanding and fluidity with iPads to better prepare them for future endeavors with children and families.

The interconnections between suggestions are represented in the Cluster Analysis shown in Figure 3. Each line represents numerous connections between suggestions, such as *Time* and *Learn the Device*, meaning that students from all three focus groups strongly suggested that they be provided more time in class to learn the device itself. This illustration of the interconnected suggestions further contextualizes the data with narrative exemplars (Table 58), providing student suggestions for improvements as they relate to teaching practices with iPads.

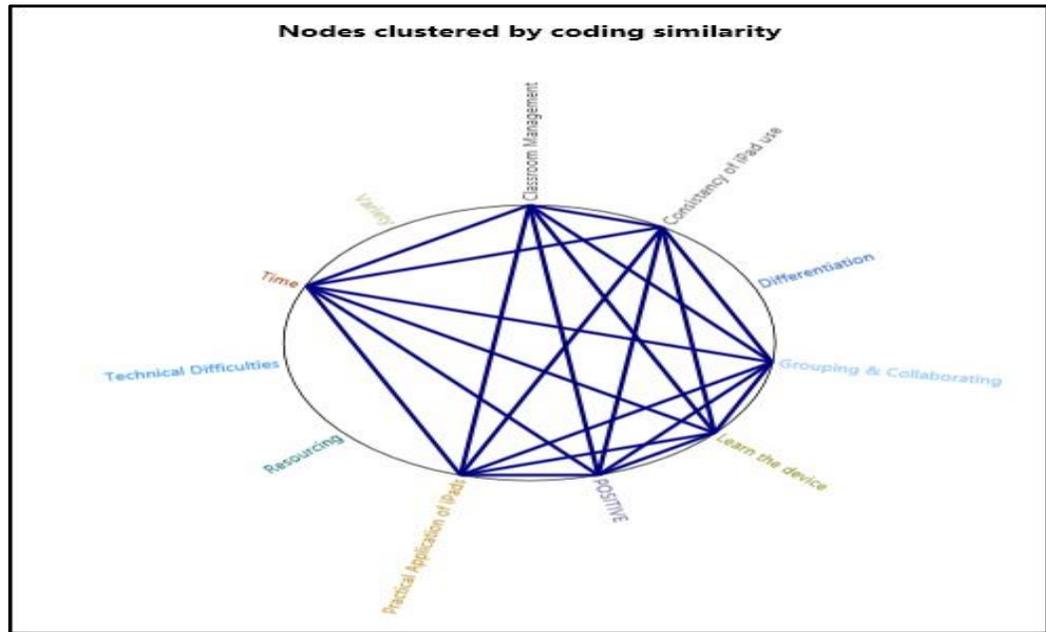


Figure 3. Cluster analysis of suggestion connections

Table 58

*Focus Group Connections of Factor One to Suggestions*

Factor/Suggestion Category	F1 Exemplars
F3, Model Digital Age Work and Learning  Time Learn the Device	“I want to point out that some people have not had iPads before this class and if they are going to use iPads they need to give students a chance to learn with it before the use it in lessons. It’s like a computer but there are differences. If you’re not acclimated to it and you’re trying to do a project with it you end up constantly falling behind.”
F5, Engage in Professional Development and Leadership  Differentiation Variety	“Like with Haiku Deck [web based app], there was a pretty rigid outline of what was expected. I felt like it wasn’t as organic and that goes back to having multiple ways to express that and being creative.”

## Focus Groups Feedback on Factor 2

There were minimal connections between Factor 2 (F2), Develop Digital Age Learning and Assessment, and democratic tactics, making teaching elements regarding assessment nearly invisible within the matrix coding analysis. F2 results had a consensus of neutral regarding teaching practices with student iPads. Suggestions centered on bridging content to iPad applications and other digital-age resources to support their learning.

Table 59

### *Focus Group Connections of Factor Two to Suggestions*

<b>Factor/Suggestion Category</b>	<b>F2 Exemplars</b>
F2, Develop Digital Age Learning and Assessment Resourcing	"There was a disconnect between videos shown in class and digital age content."
F2, Develop Digital Age Learning and Assessment Differentiation Resourcing	"I live out in the country and so they're [these districts] requiring that these kids take home the iPad. Well, a lot of parents who live out in the country don't have internet because it's too expensive so requiring them to do homework on the iPad is unfair because they can't afford it."
F2, Develop Digital Age Learning and Assessment Classroom Management Time Learn the Device	"A benefit as far as building community was that because some people who didn't understand maybe the younger generation could help the older generation, or digital immigrants, are helped by digital natives so that builds community but only if there is a reasonable timeline."

## Focus Groups Feedback on Factor 3

The most prevalent connections to Factor 3 (F3), Model Digital Age Work and Learning, were Context, Learner-Centered, Collaboration/Community, and

Mentoring democratic tactics. F3 was deemed innovative by all three focus groups. This factor was broader in scope than other factors due to varied interpretations by students of what “digital age work and learning” meant. For some, the introduction to the device modeled F3. For others with a stronger grasp and fluency with technology, more advanced applications qualified F3 as innovative. Suggestions were primarily technical in nature, aiming at developing more technical skills that were varied and practical to their professional endeavors with young children and families. Suggestions also included consistency with using iPads and exploring applications, and to provide more direct instead of open-ended instruction on how to navigate around technical barriers.

Table 60

*Focus Group Connections of Factor Three to Suggestions*

<b>Factor/Suggestion Category</b>	<b>F3 exemplars</b>
F3, Model Digital Age Work and Learning Classroom Management	“But as far as the quests, a digital classroom is different than the iPad. It was innovative to do the gaming but I never did it on the iPad. I wasn’t sure if this was strictly iPads or 3D GameLab, I personally loved 3D GameLab. It was fun and you see your grade change as you go and the reward system.”
F3, Model Digital Age Work and Learning Consistency Time Learn the Device Differentiation	“Maybe at the beginning of the semester or throughout that she could do iPad tutorials during her office hours. It’s hard in class because you do have such a split population with iPads and iPhones. Some understand and others don’t but spending the time on iPads instead of class. Just to offer it up. We prefer her rather than IT.”
F3, Model Digital Age Work and Learning Practical Applications	“This goes with the course relevance, it’s how, I mean I get the point of why to incorporate technology, but sometimes there’s really no reason to have it. It depends on the content in the course.”

### **Focus Groups Feedback on Factor 4**

There were very few connections between Factor 4 (F4), Promoting Digital Citizenship and Responsibility, and all democratic tactics, making combined elements categorized under this factor nearly invisible in the matrix coding. Student opinions of F4 resulted in a consensus of not innovative. This finding is important, though the connections were weak, because the suggestions by student focus groups asserted the desire to be more tech savvy so as to develop as leaders with technology in professional settings with future clientele. This is a direct reference to intentional propagation of practices witnessed and experienced in ECDE and FCS courses at TWU during this project, thus, a subsequent culture of innovation forming.

Another important aspect to be considered from these findings was that F4, Promoting Digital Citizenship and Responsibility, was not substantially connected to any democratic tactics. It can, therefore, be determined that iPads did *not* provide sufficient support for learning to change teaching practices as they related to assessment and were discounted within the context of university ECDE and FCS courses. Assessment for the ECDE courses included assessment strategies in early childhood classrooms, while assessment in FCS courses was primarily in relation to student assessment systems, such as quests to achieve points in Professor B's 3D GameLab. Surprisingly, analysis from Research Question Two showed a shift from Voice 1 to Voice 2 in F4, but there were minimal cross-references relative to other

factors. This further corroborates these findings that F4 was practiced less frequently with students in tech-in-hand dynamics.

Table 61

*Focus Group Connections of Factor Four to Suggestions*

Factor/Suggestion Category	F4 Exemplars
F4, Promoting Digital Citizenship and Responsibility  Practical Applications	“There were a lot of apps already downloaded on the iPad that were useful, but many of them I don’t even know what they are.”
F4, Promoting Digital Citizenship and Responsibility  Learn the Device Practical Applications	“I think that when it was explained about borrowing photos for presentations we were all so engaged trying to be engaged in what we were doing that only a few of us heard the rules. So, being more explicit about the kinds of activities that you may not be allowed to do with children or knowing the rules about digital devices in schools.”
F4, Promoting Digital Citizenship and Responsibility  Learn the Device Practical Applications Time Variety	“I think that if we dove into more app (continued) usage, that might have come more naturally, it just makes sense. With our platform the only thing we had to worry about were pictures. SO if we had other platforms it would be like, ‘Ok, here’s something you may run into with this...’ [...]So time set aside to address rules and regulations with certain platforms might be useful.”

**Focus Groups Feedback on Factor 5**

Pronounced connections to Factor Five (F5), Engage in Professional Growth and Leadership, were Context, Learner-Centered, Collaboration/Mentoring, and Reflection democratic tactics. F5 had the widest breadth of associations to tactics, meaning that this instructional priority was integral to innovating experiences and

subsequent goals with student iPads for the Fall 2015 ECDE and FCS courses.

Student suggestions under F5 included exploring practical applications to meet client needs as future educators and human service practitioners, a wider variety of resources and apps to choose from, and time to practice using iPads and apps prior to implementing them into their own classrooms or professional settings.

Table 62

*Focus Group Connections of Factor Five to Suggestions*

<b>Factor/Suggestion Category</b>	<b>F5 Exemplars</b>
F5, Engage in Professional Growth and Leadership  Consistency Practical Application Classroom Management Differentiation	“I think also [ ] that if there is going to be iPad usage we should be notified. It may be a foreign context for some. So the content should match the days we use them in class.”
F5, Engage in Professional Growth and Leadership  Practical Application Differentiation	“I feel like everything was centered around very young children. Maybe that’s more what the course is mostly focused on, but I know that when we did observations of places like classrooms, I know that my kids were older and older environments, so that was...so more practical applications to our careers. Like it would have nice to get to know the games or those apps so we could take it out of this classroom. Like even if it’s for kids and we’re adults, we still have to get to know them.”
F5, Engage in Professional Growth and Leadership  Practical Application	“I want to be prepared to be a technology leader for children.”

## Findings Summary

### Research Question One

Professors A, B, and C naturally employed democratic tactics for implementing student iPads into their ECDE and FCS courses. *Naturally* implies that there were no rubrics or top down mandates to utilize the device in any predetermined fashion outside of their self-designated group. Choices in what was needed, how to proceed, and how to evaluate success were entirely generated from the bottom up.

Bottom up innovation included ownership, context, and learner-centered democratic tactics. Ownership was nearly absent from all data with no general sense of ownership of the device or its applications. This affected the relationship professors and students had with the device. The limitations they faced when attempting to manipulate the device impacted their motivation and ability to explore beyond the infrastructure as it stood at that time.

Context and teaching practices were closely connected and were referenced regularly in all data sources. Contexts were considered for student populations, technical savvy, course and lecture content, professional paradigms, and learning goals. Contextual influences were heard throughout the discourse and seen in classroom observations. The context democratic tactic emerged as the key component for all three professors during their innovation processes, but within certain contexts, the iPad fell short as a pedagogical tool, such as for student reflections/journaling or exploring assessment strategies.

Learner-centered tactics were, in essence, the experiences shaped by preferred means of gaining knowledge, catering to strengths, weaknesses, and interests of individuals. Learner-centered experiences played a large role in how professors transferred their knowledge and designed their lessons. If they learned best in small groups, small groups appeared in their curriculum designs. If they used a variety of apps for their own professional growth, they downloaded many apps for students to explore. If content took priority over technology, it was stated frequently so as to impress upon students the importance of understanding content and purpose over technical skills.

Ongoing-support during the professors' innovation process included collaboration/community and mentoring with one another. The Collaboration/community tactic was referenced less frequently than context and learner-centered tactics, but still had a presence in the data. Common classroom activities included group work, collaborative efforts among students to navigate the iPads, and sharing information or ideas.

The self-designed group of professors spoke highly of the benefits of their collaboration but had few connections to Ongoing Support, which was an unexpected and interesting finding. During the analysis phase, incorporating student mentoring, primarily digital natives pairing with digital immigrants, was one expansion to the definition. Another element added was providing mentoring and desiring mentoring.

Mentoring among colleagues surfaced naturally, as they took on leadership roles to discuss areas of their expertise. In this dynamic, mentoring took the shape of pedagogical and technical techniques and suggestions for the other professors to explore. For students, ongoing support came from their professors and from more digitally fluent classmates, which was the impetus for the student-to-student aspect added to the definition.

Reflection entailed both reflective and reflexive experiences. Reflection occurred when professors shared teaching practice ideas, classroom activities, mitigated barriers, and planned to improve future classes. Reflexivity was heard in the debriefing sessions and in reflexive journal entries about what, why, how they wanted to use technology-mediated activities with their students. These combined elements had a strong influence on teaching practices, verified by numerous classroom activity observations that incorporated reflection of learning and changes in how professors and students used iPads after debriefing meetings.

F1, Facilitate Student Learning and Creativity, F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership, were dominant teaching areas in the discourse among professors and were visible throughout the process. The fewer connections to F2, Digital Age Learning and Assessment, and F4, Promote Digital Citizenship, were visible in the discourse and in the observations but with a lower frequency of discussions about assessment or developing digital citizenship. These findings denote a propensity toward creative

and practical uses with iPads that have potential to benefit student's professional goals, versus using them to develop or monitor growing digital prowess.

### **Research Question Two**

Analysis showed that Factor 1, Facilitate Student Learning and Creativity, shifted minimally and was primarily negotiated through Voice of Self/Autodialogue. This indicates that the reflexive nature of this process facilitated professors' introspection of *why* they were using iPads in new ways versus old ways because it was primarily communicated through Voice of Self and did not shift. This factor based on creativity was not negotiated among professors to a degree that they abandoned traditional methods all together; yet, students still deemed it as innovative. This can be attributed to the general newness of using iPads in ECDE and FCS courses.

Factor 2, Develop Digital Age Learning & Assessment, was also primarily negotiated through Voice of Self/Autodialogue and had a noticeable shift from Voice 1 to Voice 2. Although a shift took place, professors did not discuss assessment strategies often enough for it to be sufficiently connected to and actualized in their teaching practices, recalling that all numerical findings were relative to the number of cross-references within the same teaching practices category.

Factor 3, Model Digital Age Work and Learning, was negotiated between Voice of Self and Voice of Others, with the most notable shift from Voice 1 to Voice 2. These findings reflect the influence of collaboration and community among professors on teaching practices to a degree that it was highly visible in the analysis.

The implementation of student iPads as a joint venture, by definition, modeled digital age learning as both students and professors were learning functions and affordances simultaneously. The dramatic shift was reasonable because these exploratory semesters incorporating student iPads was quintessentially digital age work in contrast to traditional practices in past ECDE and FCS courses.

Factor 4, Promote Digital Citizenship and Responsibility, was primarily negotiated between Voice of Self and Voice of Others, with a shift from Voice 1 to Voice 2. Again, this demonstrated the influence of the collaboration among professor participants. Although a shift took place, topics in relation to digital citizenship and responsibility did not emerge as influential to teaching practices and was minimally visible in the analysis.

Factor 5, Engage in Professional Development and Leadership, was primarily negotiated between Voice of Self/Autodialogue and Voice of Others, with a major shift from Voice 1 to Voice 2, evidenced in the large amount of cross-references in the analysis findings. The additional finding, that this factor was connected to all democratic tactics excluding Ownership, shows that discourse focused on proliferating professional activities using iPads touched upon almost every aspect of the innovation process and had a strong influence on teaching practices that fostered professional growth for future educators and human service practitioners. This is discussed in more detail in Chapter V.

### Research Question Three

The last portion of this research explored student opinions of the innovativeness of teaching practices over the course of the Fall 2015 semester. Prompts were determined for individual focus groups using the preliminary analysis of connections between professors' democratic tactic experiences and factors. Students were asked if they agreed or disagreed to witnessing such manifestations, how innovative they believed those activities with iPads were, and suggestions on how to improve practices for future ECDE and FCS courses.

Analysis revealed that students primarily agreed with connections reported in the preliminary analysis, evidenced by the Word Frequency and Matrix Coding analyses of all three focus group discussions. They also reported Factors 1, 3, and 5 as *innovative*, which aligned exactly with the data reported in Research Question One, connecting democratic experiences of professors to factors. Focus groups reported Factor 2 to be *neutral* and Factor 4 to be *not innovative*. Referring to Dewey's (1938) statement about social environments shaped by its constituents, it is reasonable that professors' actions, or lack thereof, affected student perceptions and subsequent opinions about teaching practices. If a concept or goal was not explicit in the instruction in tech-in-hand dynamics (dialogic relation, Voice 2), learners might perceive it as less important, lower on the priority list, or possibly not compatible with iPad functions.

## Summary

The purpose of this study was twofold. First, was to determine if democracy was a viable avenue for iPad implementations, evidenced in dialogue and innovative teaching practices. From the findings, it can be gathered that the democratic route influenced teaching practices in many ways. Ownership and Collaboration/Community had fewer connections to teaching practices with student iPads, attributed to issues such as technical barriers and general agreement between professors in their discourse, respectively. Context, Learner-Centered, and Reflection tactics had substantial connections to teaching practices with data supporting the concept of exploration versus establishment during an exploratory iPad implementation process for professors of ECDE and FCS courses. During this neophyte stage of technology-mediated instruction and learning, exploration was the overarching theme and rendered the idea that this is an important preliminary stage of technology implementation in classrooms.

The connections between professors' experiences captured through their language in dialogic exchanges exposed areas that were heavily influenced by others, such as how to model digital-age work and learning or how to engage students in professional growth and leadership activities. Other areas maintained original positions about iPads, in particular, learner-centered approaches to teaching.

The second purpose was to explore if the ideas and opinions of students after a semester exploring iPads with their professors reflected consideration of iPad

technology for their own professional careers with children, students, and families, thus, suggesting a proliferation of a culture of innovation. Students did report that time to explore and learn the iPad was beneficial to their futures, but that technical difficulties hindered full access to this new pedagogical tool. Suggestions of how to provide better support systems for those less versed with iPads alluded to future professional practices that consider differentiation strategies. Students wanted more from the iPad, particularly the degree to which they practiced using age appropriate applications. The messages I received were that students believed the iPads could be an asset to them and that they wanted to be trained to be viable sources of information for their professional target audiences in future professional contexts.

I extrapolated and interpreted the interconnections of democracy, dialogism, and emerging cultures of innovation using an ethnographic methodology in conjunction with hermeneutic contextualism. This provided truth-value and applicability because the methodology was flexible and naturally adjusted to the innovation climate throughout the process. The truth-value was in the experiences of both professors and students whose very words paved the paths toward technology-mediated pedagogies. Applicability was provided in the contextual nature of this framework that allowed human agency to lead the way to change, in gradual, natural, intrinsically driven ways. In Chapter V, I discuss the importance of all these findings and present the social significance in broader terms for teachers and education leaders interested in bottom up innovation with student iPads.

## CHAPTER V

### DISCUSSION

In this chapter, I review the key findings of this research and suggest implications of their importance for future educators and human service practitioners. The three key connections that comprise the theoretical framework include: democracy, dialogism, and culture of innovation (Bakhtin, 1973; Dewey, 1916; Moss, 2011; Sharples, 2007). Essentially, I expose how educators' self-driven and designed student iPad innovation experiences can influence their subsequent teaching practices with student iPads. These practices were, in part, manifested through dialogic exchanges or negotiations that had taken place within their small collaborative community in a joint venture to develop the technology infrastructure in their department. Decisions made from negotiations that influenced student perceptions of technology-mediated activities in their future respective fields working with children and families were proposed as signs of an emerging culture of innovation. Any development of a voice, or position, about iPads for learning, whose genesis could be, in part, traced back to students' iPad activities in their Early Childhood Development and Education (ECDE) or Family and Consumer Sciences (FCS) courses at Texas Woman's University (TWU) propagated this culture of innovation.

This project evolved beyond the discourse of mandated education technologies and concerns about the appropriateness of technology usage for educators and young children. This research elicited a new model, or reconceptualization, showing how any educator can employ their own agency to implement tablet technologies into their instruction that are pragmatic and contextually relevant to them. This information draws a picture of a *process*. A mantra in the early childhood education field is, “it is the process, not the product,” which can apply to educators today who are amidst a cultural and paradigmatic shift in the wake of globalization (Goodenough, 1935, p. 431; Moss, 2007). This research demonstrated how the journey of finding appropriate practices with mobile technologies influenced what students had believed about its implementation into their coursework. What that journey entailed depended on the community that surrounded it, shared visions, and the experiences that shaped the path. From this perspective, it was concluded that community member choices established a protocol for others to follow and, thus, allowed its constituents to craft a culture.

This research is premised on democracy in education proposed by John Dewey (1916). Dewey’s progressive thoughts on democracy were applied to this study as expressed in this quote:

The social environment consists of all the activities of fellow beings that are bound up in the carrying on of the activities of any one of its members. It is truly educative in its effect in the degree in which an individual shares or participates in some conjoint activity. By doing his share in the associated

activity, the individual appropriates the purpose, which actuates it, becomes familiar with its methods and subject matters, acquired needed skill, and are saturated with its emotional spirit (p. 25).

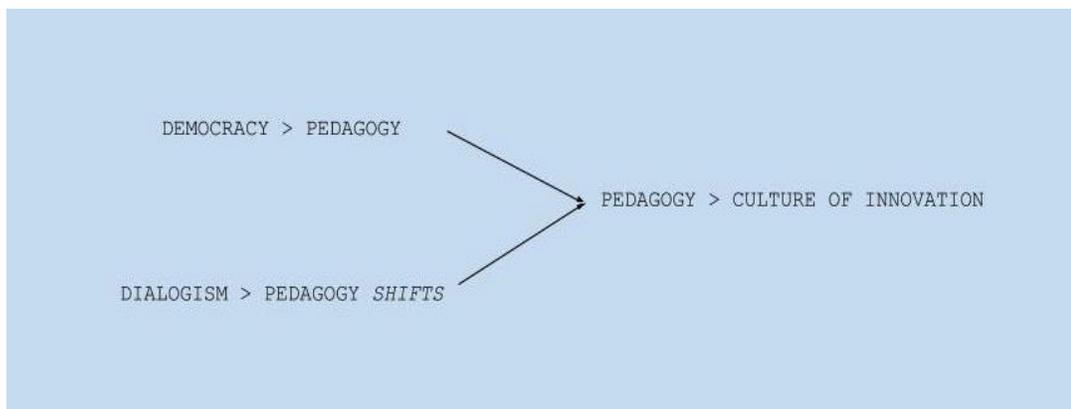
Democracy in education does not mean to vote on what is best, per se. Rather, democracy entails the choices, negotiations, abandonments, and adoptions determined by people conjoined to the environments in which these choices affect. For the three professors participating in this research, their processes of tablet integration inadvertently built a culture of innovation among their students who aspired to advocate for young children and families. These are the key meanings behind their journey as they pertain to the framework of this research.

### **A Brief Review: Problem, Purpose, Limitations, and Delimitations**

Literature on technology implementation in all levels of education was saturated by accounts of top-down mandates to innovate with technology, brandished with episodic professional development requirements, resulting in varying degrees of resistance and acceptance (Hall et al., 1991; Kazempour & Amirshokoochi, 2008; Khalil, 2013; Koole, 2009; Ouzts & Palombo, 2004; Sharples et al., 2007; Yelland, 2009). This research referred back to Hannafin et al. (1987) who stated, “instead of promoting adoption and diffusion, change is often stonewalled due to territorial, personal, and political threats posed by innovation” (p. 7).

## Problems

This research addressed three intertwined problems concerning the lack of empirical data in the following areas: democratic tactics, pedagogical shifts, and their influence on teaching practices. First, contemporary research lacked empirical data connecting democratic tactics for innovating with student iPads to pedagogy. Second, the research lacked empirical data connecting pedagogical shifts with iPads to the decision-making processes that manifested them. Third, the research lacked empirical data connecting teaching practices to student considerations of iPads usage for Early Childhood and Family courses and future professionalism. Figure 4 illustrates how these constructs were connected and how they were paired in the analyses.



*Figure 4.* Broad connections between democracy, pedagogy, dialogism, and culture

## Purpose

The purpose of this research was to provide empirical data that addressed each of these three problems. The ethnographic design contextualized the process of change and offered a new model that exposed how iPad implementation could be

practical and meaningful if maintained democratically in educational settings. My methodology was designed purposefully with democracy as the foundational approach for changing teaching practices with technology (Dewey, 1916). The *Dialogical Self Theory* (DST) illuminated the process of shifting teaching practices with student iPads through a series of negotiations among educators (Bakhtin, 1973). Sharples' (2005) *Culture of Innovation* was a key concept because it operationalized the process to capture relevant student feedback about their learning experiences, inferring new considerations about technology-mediated work and learning. To address each of these questions, numerous data sources were collected over the course of 1-year. The corpus of data included: interviews, classroom observations, reflexive journals, debriefing sessions, researcher reflections, and focus groups to represent each course affected.

### **Limitations**

There are four notable limitations to this study. First, only three professors collaborated on the student iPad project at TWU, making the sample very small. Second, the study was conducted over the course of 1 year and from 6 courses, again, making the findings not generalizable but rather creating a snapshot in time, contingent on the technologies of that time. Third, the makeup of each focus group varied and could not be representative of the whole population of students in the courses. Fourth, hermeneutic contextualism and empathic neutrality were employed in this exploration, which was heavily context bound; therefore, findings and discussion were only suggestions for future like-endavors.

## **Delimitations**

A delimitation to disclose was the use of only six democratic tactics, which was determined by an inventory process charting frequently referenced democratic practices innovating from the literature. Some key search terms included: *democracy in education, iPads in higher education, m-learning frameworks, integrating iPads into early childhood classrooms, and non-traditional professional development*. Although other democratic tactics may have influenced professors' pedagogies, they were not included into the analysis. The reason for this delimitation was to streamline the concept of democracy for innovation into succinct categories that showed to be important in education research (Baran, 2014; Barrett-Greenly, 2013; Carlson & Gaudio, 2002; Koole, 2009; Sharples et al., 2007; Sharples et al., 2009; Wenger, 2000).

The second delimitation was the selection of NETS-T factors (ISTE, 2002), K-12 technology standards for educators, to categorize teaching practices despite many other constructs available in research literature (Hall & Hord, 1987; Lave & Wenger, 1991; Mishra & Koehler, 2006; Rogers, 1962). The choice to use NETS-T was its primary focus on technology in classrooms as well as the breadth of teaching practices that could be categorized under each factor. This allowed me to make connections more applicable in other educational contexts. If the categories of teaching practices in a democratic model for innovation were too narrow, it could mistakenly be considered a niche and, thus, dismissed as not applicable to educators in all school levels or in other cultures.

The remainder of this chapter is organized in same order as the research questions since the process of democratic innovation was a progression of considerations and activities with iPads. Each section highlights the key findings with confirming and contradicting data presented, and the remaining questions push this area of research further into future studies. A discussion on the development of a new model for integrating iPads in educational settings is paired with the social significance of this research. This chapter concludes with researcher reflection, biases, contributions, and broad implications of this study to the field of Early Childhood Education and Family and Consumer Sciences.

### **Connecting Democracy to Pedagogy**

For Research Question One, I sought to extrapolate the influences of conducting a democratically driven enterprise to innovate with student iPads on shifting pedagogies among two university professors teaching Early Childhood Development and Education (ECDE) courses, and one professor teaching Family and Consumer Sciences (FCS). Students in these courses included future early childhood educators, occupational therapists, child life specialists, and other human service practitioners. Much of the content in all courses was premised on education and advocacy tactics for young children and families.

### **Weak Connections Between Collaboration/Mentoring Tactic and All Texts**

At the onset of this project, due to the regular and open dialogue during the debriefing sessions, I assumed that Collaboration/Mentoring would be closely connected to teaching practices, but that did not show in the data. The literature

supported the assumption that collaborators within a department provide depth of understanding with technology while multidisciplinary dynamics support a wider breadth (Becker & Riel, 2000; Drouin et al., 2014; Hogue, 2012). In this study, the professors' collaboration and mentoring did not shift teaching practices, but rather, it refined their needs of their collaborative efforts and redefined what role mentoring would play for them as learners and mentors to their colleagues and to students.

In the beginning, professors had equal access to the infrastructure that supported new student iPads. As time progressed, each member assumed different roles as "idea leaders," building understandings of how to actualize iPad-mediated instruction (Hogue, 2012). Professor A maintained the importance of child development theory and purposeful planning of mediation of instruction with iPads and activities. Professor B provided ideas for digitally mediated classroom activities, while Professor C oversaw technical maintenance and offered a wide variety of iPad and web-based applications to explore with students.

Experiences shared within the professors' intimate community contributed to the data because it lent perspective on the types of teaching practices under consideration. Dexter et al. (1999) found that constructivist methods for integrating technology into the classroom required a supportive climate of exploration, which allowed concerns to be voiced. Professors' recollections, strategies, and struggles with iPads, pedagogy, students, or with the infrastructure mitigated some barriers that they faced and contributed to their pedagogical repertoires, but these elements

did not affect their actual teaching practices as much as other democratic experiences did. This new context that emerged from the study was documented well in the literature (Cochrane, 2010; Drouin et al., 2014; Efaw, 2005; Hogue, 2012; Lefoe et al., 2009). Implications of the connection between mentoring and teaching practices include a consideration of broader definitions of what mentoring means so all parties involved play a role in supporting one another during the innovation process with technology. Given the diversity of educators, parents, and students, there is much to gain from unique experiences, insights, and knowledge bases. Further, the support this type of cohort assumes must be ongoing so as advances are made, insights are gained and continue to be relevant.

One question arose from these findings: Why would collaboration and mentoring experiences have less influence on teaching practices than other tactics when there was a strong community built around the innovation? One thought on the matter was that they did not reference their collaboration in conversations among each other in the debriefings where most interactions had taken place. Rather, the bulk of statements about collaboration or references about the other professors were captured in interviews and reflexive journals. This leads future researchers to consider maintaining a balance of data sources because the nature of data sources and collection methods can influence participant responses.

### **Ownership was Absent**

Ownership, a bottom up democratic tactic, was nearly absent from the findings but had a strong presence in research literature (Barrett-Greenly, 2013;

Bennett et al., 2012; Cochrane, 2010; Eichenlaub et al., 2011; Jones et al., 2006; Kukulska-Hulme, 2012). The literature defined ownership in two ways: 1) personalization of a device, and 2) ownership of a device and its applications. First, personalization of a device refers to case selection, app arrangement, screensavers, and so forth (Cochrane, 2010). Second, ownership of applications refers to downloaded material from personal accounts (Bennet et al., 2012; Cochrane, 2010; Jones et al., 2006).

The absence of ownership of the device and applications in this project influenced how professors managed and utilized student iPads. Lessons on clearing caches or histories, continuous updates and downloads on the 40 student iPads, and iPad maintenance were present while student liberty to download was absent, making the choices of the professors the limitations on the students to explore beyond set parameters. A new acquisition automatically limited by ownership has the potential to negate the “deschooling” that Eales et al. (2002) referred to as the informal digital means for acquiring new knowledge.

From these findings, several questions surfaced: 1) How can student downloads be managed in future ECDE and FCS courses, and does opportunity of ownership shift the degree of ownership of the professors and institutions? 2) How would that degree of student ownership impact pedagogy? 3) How would that context look in light of a technically diverse student population? 4) Would that require prerequisite courses to minimize class time on technical development?

Ownership was found to be more complex than originally perceived and warrants more research.

### **Connections between Learner-Centered Tactic and Learner-Centered Teaching Practices**

Learner-Centered, a bottom up tactic, had profound connections to professors' teaching practices. Ways and means for them to share contextual information or to make learning visible transferred to the assignments they gave to students. Moody and Kindel (2003) asserted that educators who taught more qualitative content used iPads for communication, word processing, or for presentation purposes. This was corroborated by professors' frequent usage and flexibility with platforms to communicate about, to build, and to share student work. Further, Carlson and Gaudio (2002) emphasized the importance of educators' own perspectives on the pedagogical soundness of each app, which was a process each professor underwent in the debriefing sessions as they negotiated effective, learner-centered practices with apps.

The implications of this connection are to first take inventory of what is prudent to educators and inquire about how they, themselves, learn best. This includes content and/or technical skill development. The second is for educators to honor individuality by attending to the diversity of their students. To do this, they may employ classroom activities with student iPads that encourage building on individual interests, skills, and needs. As students develop professional skills in their courses, they build expertise that influences his or her future professional practices

with children and families. Collectively, professors and students build on their interests and skills through which cultural artifacts emerge, such as priorities, impactful activities, professional paradigms, and so forth. These artifacts surface from negotiations in dialogue over time. As Bakhtin (1973) asserted, dialogues are meant to be ongoing if understanding and knowledge are to evolve.

Researchers investigating learner-centered approaches in classrooms reported motivation as a key factor to its success (Jones et al., 2006; Koole, 2009; Lee, 2005; Liu et al., 2008). Motivation to explore areas of interest in conjunction with creating meaning resembles the experiences of Professors A, B, and C, and what they fostered for their students (Sharpley et al., 2007). Again, this was seen in the degree of freedom given to students to engage them and to represent their learning in class as they saw fit. Professor B's gamification system was another example of the learner-centered approach, giving students access to improve grades through self-driven quests. The results and ultimate grade in the course were in the hands of the students.

### **Context Influenced Pedagogy**

Above all other democratic tactics, context emerged as the most influential aspect of the process of iPad exploration and implementation for professors. Factors with strong connections to context were F3, Model Digital Age Work and Learning, and F5, Engage in Professional Growth and Leadership. These connections were the same for all three professors, but when synthesizing the data and taking the entire body of research into consideration, it was evident that what and how these

connections differed was the context of the course and students' professional goals. Nyiri (2002) asserts that knowledge is simply information in context; therefore, the forking of contextual uses of the iPad depended on the subject matter that addressed different professional fields.

Two key findings came from democratic and pedagogical connections in this study. The first was that context had an influence on teaching as it pertained to *what* and *how* professors modeled iPads, as well as *what* and *how* they supported students' professional agendas. The second major finding from this connection was that context impacted Professors A and C, who were ECDE instructors, differently than it impacted Professor B, an FCS instructor.

### **What and How Professors Implemented iPads: Appropriateness vs. Practical Application**

The ways in which the ECDE and FCS instructors taught differently were in their use of iPads to show appropriate practices with young children and families, or practical applications in the Family and Consumer Science settings. The blue boxes in Figure 5 show teaching practices within the context of the course that were categorized under the factors listed to the left in blue. The green boxes are student suggestions and considerations of iPad activities as they related to that specific factor/teaching practice pair. These elements illustrate how ECDE and FCS instructors approached the iPads differently and how the subsequent thoughts and suggestions of students to enhance learning with them, either for future courses or as professionals in their respective fields with children and families.

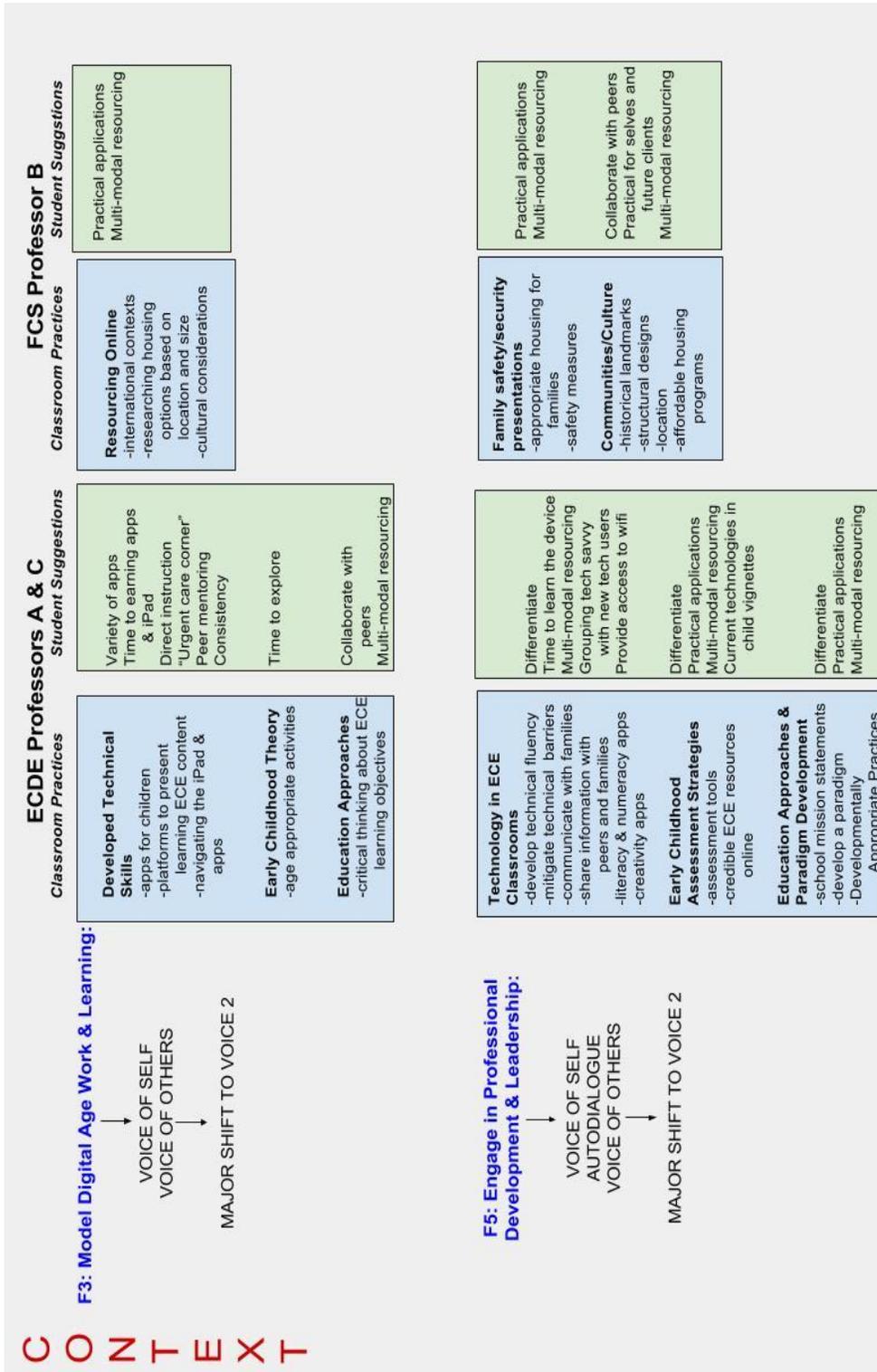


Figure 5. Context tactic shows different approaches based on context

The ECDE courses were centered on appropriate uses of iPads for young children and for future young child educators and advocates. In the early childhood field, it is imperative to understand appropriate practices, both traditional and digital, when designing lessons and engaging with children and families to support learning and development (Dahlberg & Moss, 2004). The FCS courses focused on using iPads for practical purposes, such as resourcing for children and families. In professions that provide human services, such as child life specialists, tools and resources must be part of practitioner's arsenal, so they can provide optimal family support. Carlson and Gaudio (2002) studied innovation in education extensively, finding that hands on activities were crucial for developing professional competencies, and learners must have specific applications to refer to for specific purposes in order to remain viable resources in their respective fields.

Naismith et al. (2006) propose that mobility, as it relates to interactive smart devices, include time, space, and context. In the ECDE classes, students sought expertise on the plethora of topics covered, including developmentally appropriate practices, assessment, and classroom management tools. Students in FCS courses explored cultures, structures, and employment opportunities. These varied purposes exemplified the contextual mobility factor that Naismith et al. (2006) referenced. Although the mobility of the devices is rather limited in the classrooms, digital space is vast.

ECDE and FCS are both components of the Department of Family Sciences, but they address different areas in the professional realm and, thus, call for different

iPad uses. According to the data, contextual elements, particularly the professional goals of the students, were imperative to making choices with iPads in the respective classrooms. The software that professors chose were aligned with their pedagogical goals and reinforced their lessons, offering students a better sense of what technology-mediated learning looked like within the context of their courses (Barrett-Greenly, 2013). Kazempour and Amirshokoohi (2008) made similar connections, finding that educators would lose interest in an innovation if it did not have practical applications to their work. The implications of this connection is to consider the contexts of courses prior to planning classes at any level, using student iPads, so they remained viable resources for enhancing the content of each course. Blanket implementations may not be as suitable as context specific implementations. Context must be applied during the exploration and implementation phases. This research showed that contextually driven decision-making had been an ongoing process and was renegotiated constantly as courses and student bodies changed.

Carlson and Gaudio (2002) found that successful implementations had ongoing discussions about the context of device uses paired with renegotiations of the role of the instructors. Recalling Professor A's position as the mentoring provider and then self-proclaimed "occasional town fool," she showed how her role changed shape to optimize a learning objective. The same concept applies to iPads; practices must be malleable and purposeful. Shifting techniques Professor A employed demonstrated flexibility and pushed students to use their own agency to

solve problems, as the context required it. Consistent with cultural evolutions, if students deem pedagogical techniques beneficial, they might consider them when working with young children, which is a sign of proliferating tech-in-hand strategies that originated in their ECDE and FCS courses. Teaching strategies are, therefore, culturally embedded if they are established through meaningful exchanges within a community of learners who agree they enhance learning or have promise.

There are many contextual issues to consider when working with young children. Family cultures, physical needs, diverse abilities, learning styles, age, and so forth, must all be part of the equation when planning technology implementation. Similar to the diverse needs of ECDE and FCS students, future young students and clients will have diverse needs. Therefore, as it pertains to contextual aspects to an innovation process, there is a stronger likelihood of success if educators are systematically taking inventory of contextual fluctuations. How this is done must be determined by those spearheading the innovation, otherwise there is threat of another blanket implementation that is not contextually relevant.

### **Reflection in ECDE Courses**

Reflection was comprised of both reflective activities, reviewing teaching practices with insights on how to improve them, and reflexive activities, introspective explorations of why participants made certain choices (Dewey, 1933, 1938). For all professors, the reflexive journals allowed in depth thought processes about teaching practices, both with and without technology, while reflective comments surfaced in the debriefing sessions. Aligned with the key findings, only

ECDE professors had strong connections between reflection and teaching practices.

Figure 6 shows the types of activities Professors A and C conducted as a result of their reflective and reflexive experiences.

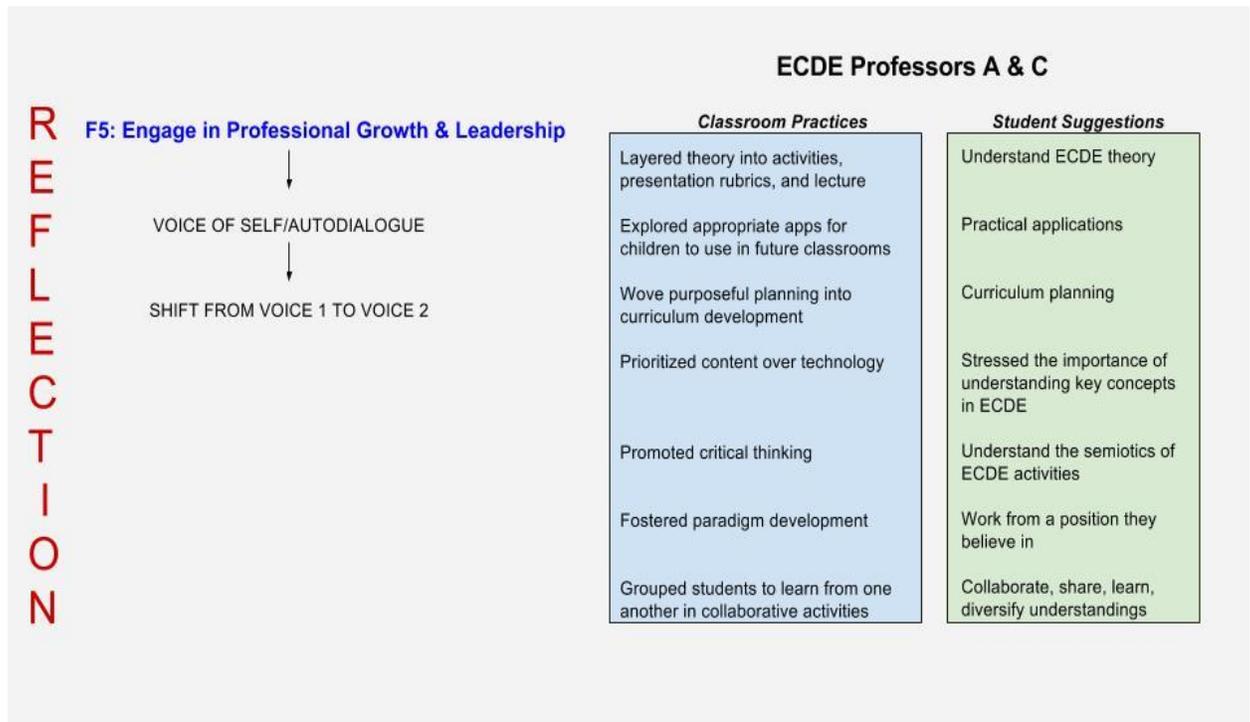


Figure 6. Reflection in ECDE courses

Professors' community efforts reflected the school of thought posed by Shields (2007) that semiotics of innovation is shaped by meaningful exchanges and introspections. This self-study, within the context of iPad implementation in ECDE and FCS courses at TWU, helped professors substantiate their iPad usage in systematic ways and develop a common language among them and their students (Gee & Hayes, 2011; Nordin et al., 2010; Schön, 1983). These are precepts of an emerging culture, rooted in social exchanges, evidenced by cultural artifacts, and influenced by introspection and dialogic negotiation (Becker & Riel, 2000; Berson &

Balyta, 2004; Breslow, 2010; Bronfenbrenner, 1979; Chen, 2010; Dahlberg & Moss, 2004; Dexter et al., 1999; Dooley, 1999; Engestrom, 1994; Gee & Hayes, 2011; Herrington et al., 2014; Yelland, 2009). Although professors had strong connections between reflection and their teaching practices with student iPads, purposeful reflection within their classes was relatively minimal. This led to the lingering question: Given the profound presence of reflection in this process of democratic innovation among the professors, how can this tactic be harnessed and applied in systematic ways with students?

### **Learner-Centered in FCS Courses**

The Learner-Centered democratic tactic had strongest ties to F1, Facilitate Student Learning and Creativity, and F5, Engage in Professional Development and Leadership, for Professor B, the FCS instructor. Again, her cross-connections referenced practical applications to students' professional goals as human service practitioners. Figure 7 illustrates these connections.

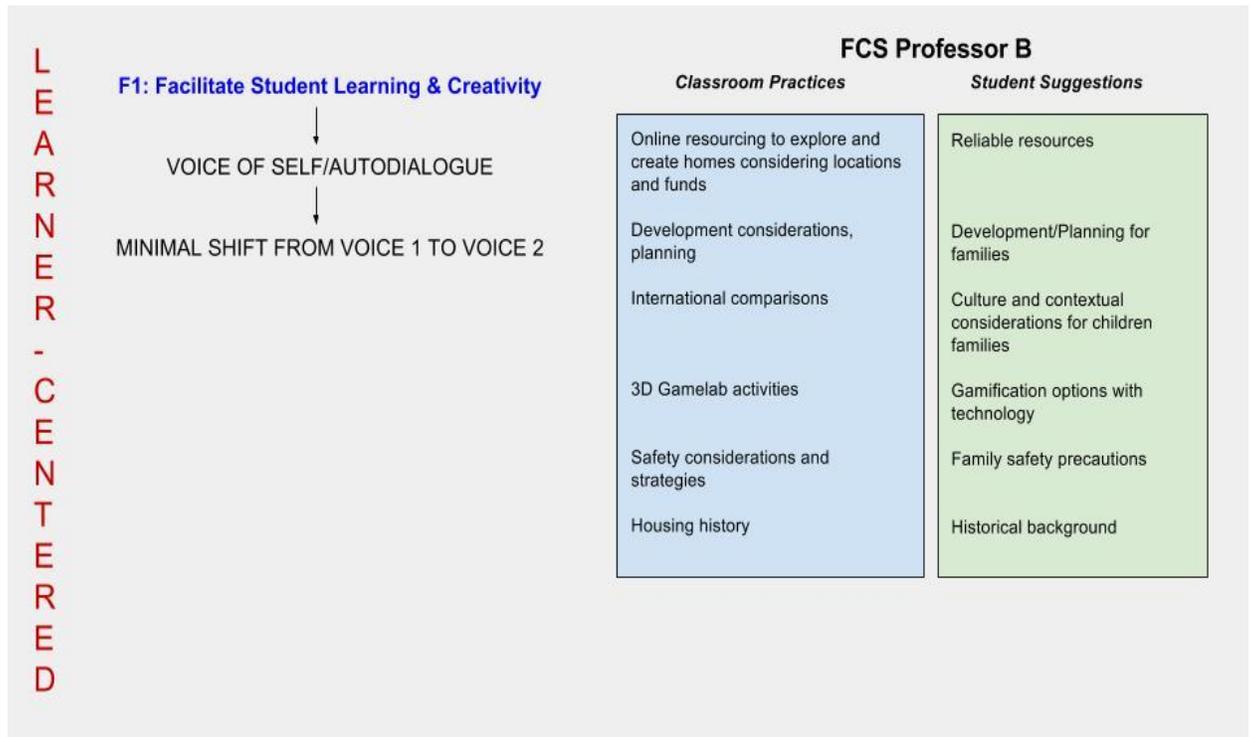


Figure 7. Learner-centered in FCS courses

Professor B used the iPads as a tool for exposing students to many practical aspects of Family and Consumer Sciences, using learner-centered activities that propelled their understanding of how to be professional practitioners with children and families. Kukulska-Hulme (2012) made strong assertions of the importance of learning *with* technology, not *about* technology. Professor B was well versed in technological affordances of iPads but did not employ them to deliver some important content of her courses out of concern students might be distracted from her teaching objective. Maintaining Voice 1 in the data of Professor B corroborated this.

The context of Professor B's courses geared toward helping families in crisis, prompted her to demonstrate how to access information and resources. She asked students to consider their own needs and interests to view a scenario from a personal perspective, a tactic Dawson (2007) recommended to drive inquiry. If technology was a barrier or too complicated for students, she chose more traditional routes. She conducted one activity in which students had to arrange pieces of paper with various items in order of importance to them. Items included: money, clothes, people, light, music, and so forth. Here, using an application overshadowed the importance of critically thinking about needs for survival so traditional measures were taken instead. Sharples et al. (2007) found that these types of learner-centered activities allowed students to reason and to create meaning of life experiences, so when the time came for them to serve the public, they were more sensitive to human conditions. Student comments suggested that these varying methods encouraged them to be creative with how to approach similar situations with future clientele, both with and without technology.

The implications of employing learner-centered teaching practices to support digital age learning and creativity for future human service practitioners are two-fold. The first is that when important or sensitive topics surface, it can be beneficial to employ learner-centered tactics that personalize them. By personalizing the information or the scenarios, a sense of their role as a resource to children and families might be authentically situated. The second implication is that using technology might not always be the optimal practice if the content has an affective

element that hands-on activities serve well. For early childhood educators and advocates who may not necessarily work with sensitive populations, the implication may be to consider learner-centered methods to address a crisis should it arise, such as for bereavement or other traumatic situations. Similar to the paper activity, it was useful to ask: What would work best if this were me? What would I need? How would I get it? Who would I go to for help?

### **Learner-Centered in ECDE Courses**

ECDE Professors A and C had robust connections between learner-centered activities and F3, Model Digital Age Work and Learning, which illustrated a key difference from the FCS instructor. The cross-references for both Professor A and C data included discussions about allowing students to explore iPad applications that enhanced young childrens' learning, particularly for literacy, numeracy, and creativity. Geist (2011) reported that pre-service teachers were prepared to guide children with technology if they had practice prior to implementing it into their curriculum. Schmidt and Ho (2013) said exploration builds confidence in pre-service teachers; while, Lefoe et al. (2009) found that preliminary exploration, especially in informal and collaborative dynamics, showed pre-service teachers how to engage children with technology in pedagogically sound ways. In the ECDE courses, using learner-centered approaches with the iPads provided students important time to explore and to practice using technology as a tool for learning and engaging. Student suggestions were primarily desire for more app options to enhance curriculum for young children. The implications of these findings are to

allow pre-service teachers time to explore, so technology-mediated learning in Early Childhood classrooms is founded on real experiences (Crook, 2000; Sharples et al., 2007).

### **Connecting Dialogic Voice and Relation to Pedagogy**

The Dialogical Self Theory (DST) (Bakhtin, 1973) in conjunction with Aveling et al.'s (2014) discourse analysis strategy were the lenses that provided a view into the negotiating voices that determined professors' teaching practices with student iPads. More contextual to the education dynamic, Wertsch (2004) asserted that contextual interactions between students and teachers propagated multiple voices within and among all actors; thus, my decision to use DST as the theoretical lens for this research.

Dialogic voices included Voice of Self that was broken down further into autodialogue or juxtapositions within ones' self and heterodialogue or juxtapositions among two or more people. It included Voice of Others that were direct quotes, indirect quotes and echoes that referenced groups or institutions' positions on topics. Dialogic relations were the modes of instruction being traditional or with iPads, described as Voice 1 and Voice 2, respectively (Shields, 2007).

Shifts from Voice 1 to Voice 2 were noted by an increase of cross-references between texts and relations over the course of 1 year exploring student iPads. Across the board, there were shifts to Voice 2. This was, in part, attributed to the nature of the research being technology implementation; therefore, findings

required an application of relative interpretations. Relativism was necessary because the data was too similar and needed to be diversified to isolate prevalent connections. The density of cross-references as they appeared in one category did not carry the same weight or meaning in the next category; therefore, hermeneutic contextualism of the researcher played a large role in the contextual interpretations and was considered a limitation of the study.

### **Voice of Self**

Voice of Self was connected to all teaching texts and factor categories, illuminating professor's experience and contributions with regard to technology. "I" positions or statements were most dominant in the discourse, indicating unwavering assertions that were not juxtaposed. Technology integration in education discussed in the literature pointed to a propensity of educators to assume their professional practice as ingrained in their identities. Randelović and Živković (2013) found that teacher identity was integrative and had "pedagogical and professional integrity and ethos" (p. 647). Connecting of Voice of Self to teacher identity explained, to some degree, the strong presence of professors' assertions that were not juxtaposed because their assertions were concomitant to their identities as educators.

The implication of this finding and interpretation is that educators have a sense of themselves that cannot be compromised, so when facing pedagogical shifts, such as implementing student iPads, it is important to consider each educator's paradigm. Disagreement that questions identity or integrity will likely be stifled.

Negotiation in a democratic and dialogic fashion about a specific practice might find more success because it is based on educator-knowledge, strength, weakness, context, goals, and experiences with mobile technologies.

### **Voice of Self/Autodialogue**

Voice of Self/Autodialogue was essentially an “I” position combined with another “I” position in reference to one topic. This shows juxtaposition within one’s self, which is prototypically dialogic. Voice of Self/Autodialogue was most associated with F1, Facilitating Student Learning and Creativity, and F2, Design Digital Age Learning and Assessment, but only F1 had substantial connections to democratic tactics implementing student iPads.

When professors planned to conduct a creative or evaluative activity in their classrooms, they most frequently referred to their own past experiences to improve future lessons. These past experiences could be previous courses they taught or thoughts they had about iPads prior to this implementation project. Resulting teaching practices, therefore, stemmed from a negotiation that had occurred within herself. This implies educator agency to determine suitable activities with student iPads inspired by conversations with others but, ultimately, self-determined. Kegan’s (1983) findings showed that educators who used their own agency to make decisions about technology did not do so in a vacuum but as a result of many social exchanges with others.

## Heterodialogue

Heterodialogue did not have overt connections to any NETS-T categories in the analysis and was, therefore, not considered influential in shifting pedagogies. This implied minimal, if any, juxtapositions among the professors. This might be considered synonymous to *agreement* with one another or attributed to taking turns speaking on the same topic without overriding one another with competing statements.

Two fundamental concepts of dialogism are that juxtaposition leads to change and that dialogue actualizes juxtaposition (Hermans, 2001; Hermans & Hermans-Konopka, 2010; Shields, 2007). This led to the lingering question: Was the overall weak connection of the Collaboration/Community democratic tactic to all texts related to the lack of disagreement among professors? If Collaboration/Community is designed to facilitate heterodialogue, is it possible that unanimously shared visions sync voices rather than diversify them? This relates back to the literature stating educators in the same departments provide depth versus differing departments or institutions that provide a breadth of ideas (Becker & Riel, 2000; Drouin et al., 2014; Hogue, 2012). In this study, all professors belonged to the Department of Family Sciences and had similar goals for the department, so it is possible that their dialogues contained agreement about their goals versus disagreement about how iPads enhanced teaching practices and, thus, shifting them. Democratic and dialogic experiences in a multidisciplinary context need further research.

### **Voice of Self/Autodialogue/Voice of Others Combination**

Voice of Self/Autodialogue/Voice of Others is a dialogic combination that entails an internal juxtaposition on a topic that is met with another assertion.

*Another* refers to a contradictory statement by the same individual, a statement by another member of the group, student statements, or an institutional position, such as TWU, the IT department, society as a whole, and so forth. An example of this more complicated triad was a discussion about gaining access to more iPad apps. One professor expressed that what they used in the past did not work in current courses, demonstrating autodialogue. She was presented then with alternatives from a colleague, a voice of other, who referred to limitations with purchasing options. This construct had a visible association with F5, Engaging in Professional Growth and Leadership, implying a complex web of juxtapositions pertaining to optimizing students' exposure to activities to help them develop technical skills for their careers with children and families. This suggests how professors dealt with barriers of iPads through dialogic negotiations, implying the importance of diverse experiences and expertise.

### **Voice of Self/Voice of Others**

The Voice of Self/Voice of Others pair represents assertions made by two or more people on one topic. This may not indicate juxtaposition, per se, but rather a meeting of the minds on a particular aspect of iPads or technology mediated activities. This construct was associated to F3, Model Digital Age Work and Learning, and F4, Promote Digital Citizenship and Responsibility, even though only

F3 had substantial enough connections with democratic tactics to be considered influential to teaching practices. This finding implies that professors create a pool of ideas to draw from to model what work and learning can look like in a digital era.

The implementation of both mobile and web-based iPads and applications automatically exposed students to new pedagogies that tied the cultural phenomenon of ubiquitous digital media and classroom learning together. Lefoe et al. (2009) attributed this type of exposure to iPads with becoming familiar enough to incorporate them into their professional activities with confidence.

The implication of this finding is to support educators to gather on a regular basis so the compilation of ideas for teaching practices with technology has breadth *and* depth (Becker & Riel, 2000; Drouin et al., 2014; Hogue, 2012). Breadth is represented in the form of diverse ideas; depth is a deeper understanding of the potential benefits of a practice prior to actually employing it in the classroom. Having a multitude of voices from which ideas and experiences speak, there is greater opportunity to gain a broader repertoire of teaching practices (Gee & Hayes, 2011; Harwell, 2003). Koole's (2009) multiple layers of learning with technology include the device, the learner, and the social aspects in which they reside, corroborating this implication (p. 27).

### **Connecting Pedagogy to Culture of Innovation**

The exploratory semesters using student iPads warranted a holistic analysis, drawing in the student perspective. The benefits of providing a stage for students to voice their opinions on the innovativeness of classroom activities were three-fold.

First, it elicited language pertaining to learning in a reflective manner, capturing deeper thoughts on the influence of iPads on learning. Second, it provided a unique lens from which to analyze the influence of iPads on pedagogy. Third, it enlightened students to two notions: exploring technology-mediated learning with iPads is a democratic venture, and there is a learning curve when determining beneficial implementations. With these situated understandings, student suggestions are valuable assets to developing a culture of innovation in a department as well as proliferating practices that were first negotiated and deemed beneficial to learning.

### **Student Reports of Innovative Teaching Practice Categories**

Students agreed overall that they witnessed elements of all five factors at varying degrees. Factor 1, Facilitate Student Learning and Creativity, Factor 3, Model Digital Age Work and Learning, and Factor 5, Engage in Professional Growth and Leadership, were reported as *innovatively* executed in their classes. Students engaged in activities in each course that fostered digital-age knowledge acquisition and production. The purpose behind these curricular designs was to expose digital options to students so they may consider adopting them for their own professional needs, thus, propagating cultural signs of pedagogy in a digital era (Sharples 2005, 2007; Sharples et al., 2009). These joint explorations and determinations of effective practices, corroborated Ravencroft's (2000) argument that agency was not reserved for the individual or technology in isolation but, rather, in the "democratic synergy of both together" (p. 248).

Students were diverse in their digital fluency, which influenced their opinions about various teaching practices with iPads. One of students' main suggestions was to be given more time to explore the iPads with support structures consistently in place to help those who struggled. An "urgent care corner" was one idea a student had that demonstrated how learning with iPads was an ongoing process. The implications of these reports are that in future courses using student iPads, professors might consider digital demographics, such as levels of familiarity, devices they own, and types of apps they know as well as apps they would like to understand better. Another implication is that it would be beneficial for educators to design their classrooms and plan lectures with support systems in place that do not hinder coursework, such as the urgent care corner or a time set aside to address technical issues. This mirrors what Dexter et al. (1999) believed, that constructivist methods for educational technology integration require supportive climates to brainstorm, explore, and voice concerns.

### **Student Reports of Neutral Teaching Practice Category**

Students found Factor 2, Digital-Age Learning and Assessment, to be *neutral* in innovativeness of classroom activities with iPads. Suggestions to improve included more practical applications of assessment tools or exposure to platforms to assist them in performing assessments of young children.

Professors' democratic experiences were connected loosely to F2 with infrequent mention of assessment within the cross-references. My interpretation was that the iPad project was in its neophyte stage of development and the primary

objective of all professors was to deliver content and meet learning objectives.

Therefore, the evident lack of connections were attributed to two possibilities:

1) concern that students would focus on technology rather than the crucial concept of assessing children, or 2) lack of pedagogically sound practices with iPads to refer to. Zhao et al. (2002) found that even tech savvy educators struggled finding suitable uses of technology if it did not fit into their paradigms of learning.

Given that only two of the three courses implementing iPads included assessment strategies as part of the core content, it is reasonable to assume that the analysis showed a neutral opinion. This was considered delimitation in future research projects.

### **Student Reports of Not Innovative Teaching Practice Category**

Students reported Factor 4, Promote Digital Citizenship and Responsibility, as not innovative. In line with this opinion, professors had minimal connections of F4 to any democratic tactics. This implies that their democratic experiences innovating with student iPads did not transfer over to teaching elements focused on digital citizenship. Further, any hints of these elements were insufficient to a degree that they were not perceived or appreciated by students.

Referring to the literature on bottom up innovation, contextualizing technology means to learn *with* technology rather than *about* technology (Kukulska-Hulme, 2012; Sharples, 2007). Therefore, it might be considered that professors' prioritization of content simply mediated by the iPads derailed some potential insights into the more complex functions and abilities of users in digital spaces.

Focus group opinions about innovativeness of this factor suffered because students came out of their courses making suggestions for more practical applications and direct instructions for mitigating barriers of the device in future courses and for future child and family clientele. Context had the strongest connections to factors overall, but contextualization may need to be diversified further to include technical aspects of the iPad in relation to developing digital citizenship.

### **Emergence of a Model and Social Significance of the Method**

The social significance of this research is represented in Figure 8. This model represents how each of the components of this study connected to one another in a progressive fashion, offering a feasible and practical avenue for changing teaching practices with tablet technologies in educational settings. With this model in conjunction with the proximal influences of digital epistemology, education leaders and educators have a base upon which to build their own path toward democratic innovations. This model guides the process so innovation can be meaningful, contextual, and minimize resistance to change because it honors teacher identities and paradigms. Furthermore, it is structured so innovators can retrace the process of their innovation to determine how and which text/factor/voice/relation combinations influence student perceptions of iPads for learning. Gained insights and considerations of pedagogically sound applications of iPads for students in their professional careers working with children and families are gleaned from the data.

Figure 8 also displays general themes and sub-themes of broad concepts of democracy that funnel down to visible experiences and tactics. Texts and Factors

are specific teaching practices categorized so they may be general enough to apply in diverse educational settings. Dialogism is the negotiation process to determine the suitability of these teaching practices. Student opinion and culture of innovation were the outcomes of the entire process. Blue arrows show the sequential process of democratic innovation, and yellow arrows suggest what areas to reflect on in light of the outcomes, desired and otherwise. Although this appears formulaic, it is flexible and contingent on the context of the innovation and all constituents involved. Flexibility was important for a venture of this sort to be contextually derived, because it requires invested parties to first determine what democratic tactics are suitable for specific purposes; whether it be for young children, pre-service teachers, adults, or other student populations. It is prudent to consider the demographics of the populace undergoing change, including their individual needs, interests, and skill levels with mobile technologies. These preliminary steps help determine the sort of collaborative community needed to accomplish goals. Using a categorization system, such as NETS-T factors, allows broader areas for participants to apply teaching practices so they are not overburdened by a minutia of pedagogical elements.

Once community is established, regular gatherings to discuss the innovation helps to share ideas, mitigate barriers, and negotiate teaching practices. Finally, taking inventory of student opinions or if the students are young, gauging their levels of engagement and degree of enhanced learning with the digital tool, provides insight into the practices that elicit those reactions. The elements that are deemed

innovative have a basis upon which to delve deeper into the pedagogical aspect, while less innovative opinions show areas that need revision, are best maintained traditionally, or need to be renegotiated. This is a new model that situates democratically mobile technologies within educational settings that are contextually relevant and align to practitioners' paradigms.

Immersed in the Family Sciences culture as a student, research assistant, and instructor, I participated in the most recent innovations taking place in the Family Sciences Department and was enthusiastic about taking on a dissertation study about iPad implementations with students. In my research affiliations at TWU, I had access to faculty attitudes about iPads that resonated in my mind about how iPad implementation might be more openly adopted if executed in democratic fashions, and how to capture this process without overt biases affecting my data.

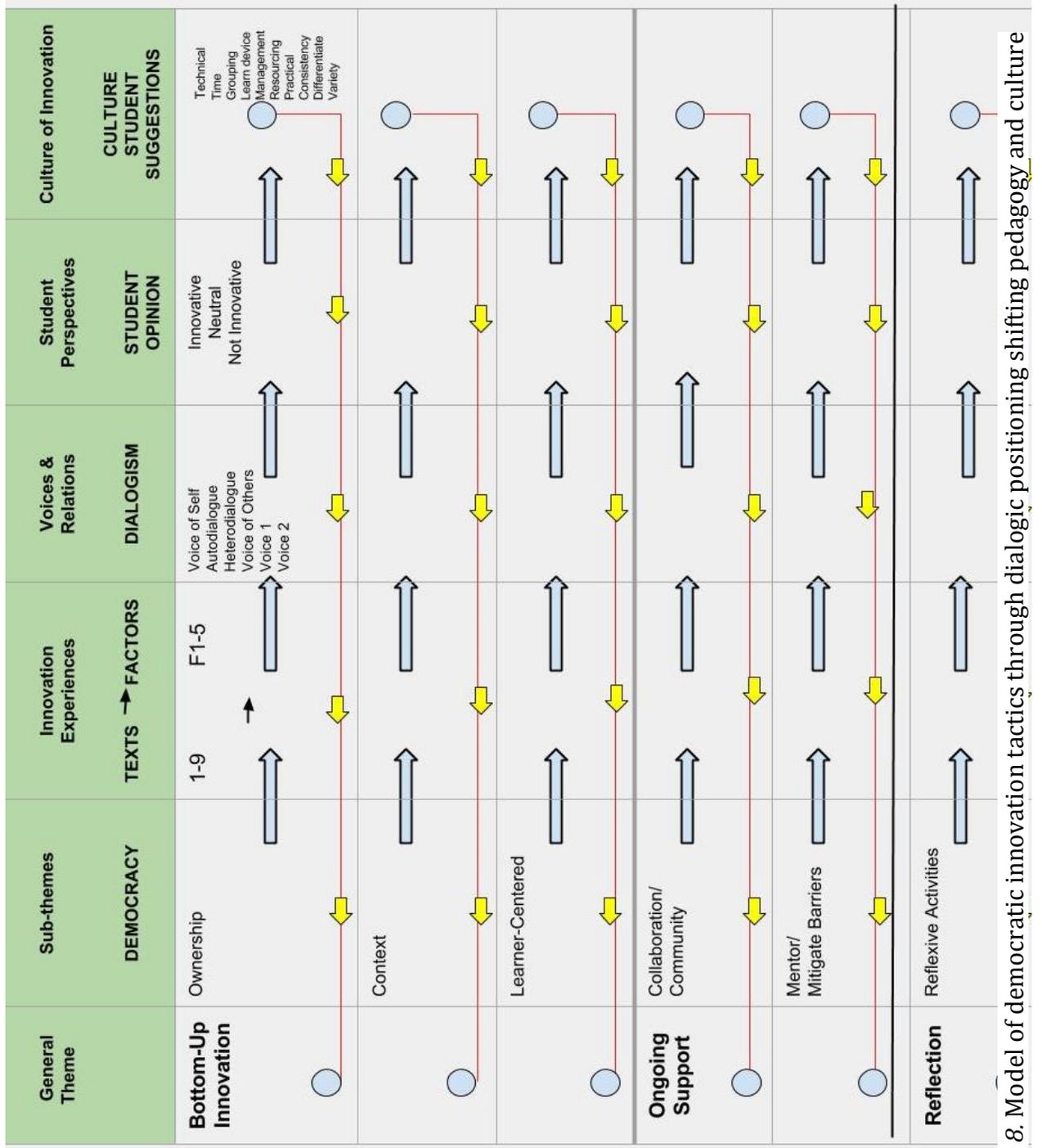


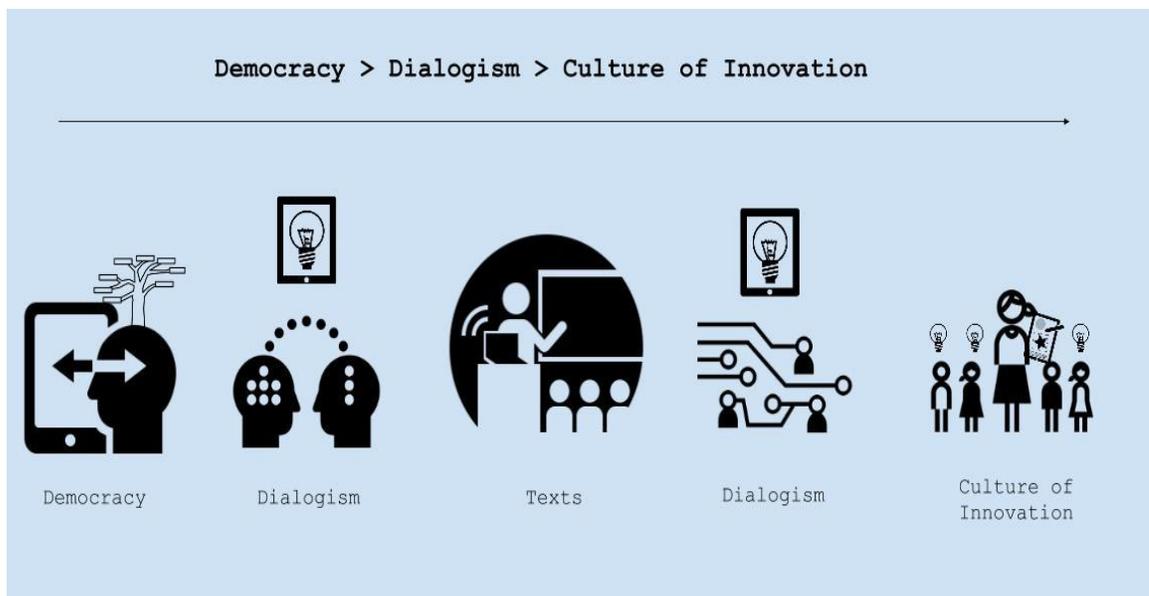
Figure 8. Model of democratic innovation tactics through dialogic positioning shifting pedagogy and culture

## Researcher Reflection

Observing resistance among some faculty who felt mobile technology was uncomfortably inevitable rather than some who felt it was an innovative tool to improve teaching, I wondered: Why do some faculty members persist in their exploration while others lose momentum (Jackson et al., 2013)? Inspired by Dewey (1903, 1938, 2008), Morrow (2009), and Moss's (2011) concepts of democracy in education, I decided to investigate how a democratic process implementing student iPads could take place with professors preparing to expand the technology infrastructure in the Family Sciences Department at TWU. My end goal was to query students on how exploratory practices with iPads could be made more beneficial in future ECDE and FCS courses and to students as future professionals working with young children and families. My belief was that students would develop their own heteroglossia or aggregated thoughts and opinions about iPads for learning (Shields, 2007). A culture of technology-mediated learning emerged by taking pieces of learning experiences as students into their professional milieus and developing paradigms that include digital media. Figure 9 is an illustration of the progression of iPad considerations from professors to students, then to the children and families these students will educate or advocate for, thus becoming part of *their* perceptions as well.

In the first image, there is a person thinking about the various uses of iPads that he or she is aware and familiar with. The second image represents dialogic negotiations, sharing ideas and opinions about iPads. The middle image is the

implementation of iPads in an educational setting. The next image shows how those experiences can be interpreted, negotiated, or perceived differently by students. The last image shows how those perceptions can lead to considerations of iPad implementations in professional settings, leading to the experiences of children. Each step is a prelude to the next in this democratic/dialogic/culture shifting process of iPad implementation model.



*Figure 9.* Depiction of democracy, dialogism, and culture of innovation exploring iPads

The importance of this model is how it addresses all areas discussed in common models for innovation in education section in Chapter II (Table 1): choice, time, affect, target, and social constructs (Hall & Hord, 1987; Lave & Wenger, 1991; Legris et al., 2003; Mishra & Koehler, 2006; Rogers, 1962). Educators are given choice of what and how to implement iPads in a bottom up design. The process is

ongoing and accounts for changes in use over time. Implementations are based on what educators deem contextually beneficial, accounting for juxtapositions that arise from personal and professional experiences. This model can be used for individuals or for groups of educators planning to innovate with technology in various classrooms or institutions. Finally, the framework is designed to foster collaboration and community to engage in dialogue that prompts change.

The next step in this line of research was to see how this model, or democratic path toward iPad integration, might be adopted in other educational dynamics. The outcomes of such methodologies for children and families who are part of the learning process could substantiate the cultivation of a digitally mediated pedagogical culture. Moss (2011) had a similar vision about the importance of democracy in education, stating:

Participation is based on the idea that reality is not objective, that culture is a constantly evolving product of society, that individual knowledge is only partial; and that in order to construct a project, everyone's point of view is relevant in dialogue with those of others, within a framework of shared values. The idea of participation is founded on these concepts: and in our opinion, so, too, is democracy itself (pp. 3-4).

Taking inventory of my own reflexive process and professional endeavors, I realized why this project was important to me as a researcher and as an educator. In the beginning, I believed that having choice meant having control over change, thus, less resistance to technological advances. When working with a group of individuals,

both colleagues and students, I realized that control was neither an important nor an influencing factor. To my surprise, *shared* vision proved important as to how technology could enhance the lives of children, educators, and communities. Although implementations varied, the professors' visions were united.

Evidenced in focus group data, students' opinions of neutral and not innovative practices mirrored their professors' choices of what would not be as beneficial to their students as future child educators and human service practitioners. Conversely, activities that students deemed innovative were aligned to their professors' experiences and robust connections of dialogic positions to teaching practices. What this ultimately meant was that students and educators may not have spoken directly to the implementation process or activities with iPads in evaluative fashions, but they collectively recognized or perceived its myriad of purposes as a tool, within context, for teaching and learning.

### **Contribution to the Body of Literature and to the Field of Early Childhood Development and Education**

In line with the problem statement, this study contributed to the body of literature in three ways. First, it provided data connecting educators' democratic innovating experiences to subsequent teaching practices. Second, it provided data connecting educators' teaching practice choices to juxtapositions they faced within their small community and in reflexive language regarding student iPads. Finally, it offered student insight about iPads that impart developing perceptions and, thus, a culture of innovation as future early childhood educators and human service

practitioners who took with them new tools for teaching and learning in this digital era.

These pathways for democratic innovation might have the potential to alleviate stakeholder resistance. With this in mind, scaffolding digital uses based on individual needs, goals, strengths, and weaknesses allows a person undergoing change with technology to bypass the fear stage and engage in the change process. Although institutional goals, state mandates, and standardizing learning requirements remain, there is a place for democracy in innovation that is rigorous and showing to be effective for change (Moss, 2011).

The overarching findings from this study led me to make these three recommendations: 1) Technology implementation in educational settings should be an intrinsically driven enterprise if it is to have meaning and endure. All parties invested in learning play a role in making that meaning, and it should be expected that these roles shift over time. 2) Context and learner-centered approaches to teaching are the keys to determining appropriate uses or practical applications of iPads for early childhood educators and human service practitioners. Considerations of professional goals lay the foundation for appropriate teaching practices; while, considerations of student skills, interests, and needs qualify teaching practices as practical. 3) Technology-mediated learning is not the goal; it is a tool for accomplishing goals. Therefore, iPad implementation for child and family professionals should be focused on exploration and not establishment.

Establishment is fixed and must be acquiesced. Exploration requires human agency, flexibility, and democracy.

### **Final Thought**

A topic as grandiose as paradigmatic shifts in early education with technology requires many new considerations. This project exposed this phenomenon by its methodological design and extracted influential voices that inspired new considerations or maintained previous voices. To place technology into the hands of future child and family advocates requires analysis strategies that can be contextualized because there is no linear path in a democratic endeavor.

Concomitant to the adjusting environments are lingering impressions about teaching and learning with mobile and interactive technologies in the classroom. As a fervent subscriber to environmental influences on culture and cognition, I believe that explicit and implicit messages conveyed through instruction and among peers are embedded into the fabric of learning. If students exit courses with a better understanding of what technology can afford them as learners, the collective notion can spread into the professional realm. It is there that interactions with children and families using technology really count, and where cultures of innovation emerge and gain momentum. This study provides a new model of how iPad integration can be accomplished from the bottom up for future early educators and human service practitioners. I close this project with a quote that inspired me to consider democracy in the early childhood field as it pertains to many facets of learning:

Why is democratic practice so important, generally and in early childhood education? The case can be put in a nutshell. Democratic participation is an important criterion of citizenship: it is a means by which children and adults can participate with others in shaping decisions affecting themselves, groups of which they are members and the wider society. It is also a means of resisting power and its will to govern, and the forms of oppression and injustice that arise from the unrestrained exercise of power. Last but not least, democracy creates the possibility for diversity to flourish. By so doing, it offers the best environment for the production of new thinking and new practice (Dahlberg & Moss, 2004, p. 4).

### **Summary**

I discussed in this chapter the findings presented in Chapter IV as they related to the three Research Questions that drove my inquiry. To address Research Question One, I used NVIVO to connect professors' democratic experiences innovating with student iPads to their teaching practices. I found that the professors did have democratic experiences that influenced their teaching but that some connections were strong while others were weak or absent.

Ownership did not influence any of the three professors' practices, primarily due to technical and managerial barriers. Collaboration/Community and Mentoring were experiences that did influence teaching but to a lesser degree. The strongest influences were the Context and Learner-Centered experiences as evidenced in the differences in what and how the professors actualized lessons with iPads. ECDE

professors prioritized appropriate uses of iPads for students aspiring to work with young children to prepare them to incorporate mobile technologies in their own professional settings. The FCS instructor employed uses that had practical applications for students aspiring to work as human service practitioners, preparing them to advocate for children and families with viable resources.

To address Research Question Two, I queried the data using NVIVO to elicit connections between professors' dialogic exchanges within their group and teaching practices. I analyzed dialogic relations that pertained to the teaching dynamic either being traditional with no technology-in-hand or with the student iPads. These two lenses made the process of shifting teaching practices visible by capturing the language that manifested professors' decisions about iPads.

Voice of Self, Autodialogue, and Voice of Others emerged as the most influential types of communication and negotiation among the professors, as well as in their reflexive journals. These findings demonstrated the ways in which these professors shared, negotiated, contextualized, and shifted their teaching practices with iPads to enhance student learning. From these connections, it could be gleaned that the process of implementing iPads was an exploration and not an establishment of practices because the Context element was changing constantly, and as mentioned above, Context was the primary catalyst for determining instructional approaches.

For Research Question Three, three student focus groups discussed opinions and considerations of student iPads for pedagogical purposes after exploring them

over one semester. I connected these insights to iPad-mediated classroom activities in ECDE and FCS courses. Student reports on innovative practices were aligned with professors' strong connections. This suggests that the context of the course not only influenced what professors believed would be best suited for their students, but it also influenced what students believed would be useful to their professional endeavors, working with young children and families.

I propose a new model to innovate with student iPads for future early childhood educators and human service practitioners that mirrors the democratic and dialogic framework of this study. First, it must be determined what and how iPads can enhance instruction, executed through the agency of the educators and students it affects. This is done through an honest inventory of educators' interests, skills, and contextual considerations of their students and courses. Second, designing an innovation process so educators can engage in a regular supportive collaboration fosters dialogue where teaching practices are negotiated openly. These negotiations are the key to change because they are practical, tried, and true; not just top down rhetoric. Third, inviting student insight to substantiate teaching practices with iPads and to discuss their considerations of using the technology with children and families in their professional fields validates the process of democratic innovation. This progression of exploring, sharing, and negotiating ideas about iPads supports the viewpoints proposed in this study because it reflects growing cultures of innovation in education by virtue of democracy and dialogism.

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APPENDIX A

PILOT STUDY IRB SIGNATURE PAGE

## PILOT STUDY IRB SIGNATURE PAGE



**Institutional Review Board**  
Office of Research and Sponsored Programs  
P.O. Box 425619, Denton, TX 76204-5619  
940-898-3378  
email: [IRB@twu.edu](mailto:IRB@twu.edu)  
<http://www.twu.edu/irb.html>

DATE: February 13, 2015

TO: Ms. Nicole Masek  
Family Sciences

FROM: Institutional Review Board - Denton

Re: *Exemption for Exploring Pedagogical Uses of the iPad in Higher Ed Classrooms Through Reflection, Self-reporting, and Dialogue Positions in a New Learning Environment"* (Protocol #: 18060)

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. Because a signed consent form is not required for exempt studies, the filing of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been closed, any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Karen Petty, Family Sciences  
Dr. Sharla Snider, Family Sciences  
Graduate School

APPENDIX B  
INTERVIEW 1 PROTOCOL

## INTERVIEW 1 PROTOCOL

- 1) How do you typically evaluate the success or failure of a classroom activity?
- 2) How do you typically assess student work and outcomes in the traditional setting?
- 3) Do you typically address students in your classes that do not appear to grasp the concepts you are presenting? How?
- 4) How do you typically plan classroom activities during a semester in the traditional setting?
- 5) Do you feel you give your students in the traditional setting liberty in designing and executing assignments based on their individual interests, skills, and learning styles? How?
- 6) Do you try to enhance lessons by incorporating outside resources in the traditional setting? If yes, how do you determine whether a lesson can be enhanced with an outside resource?
- 7) Do you typically assign group work in your traditional classrooms? If yes, how do you group them?
- 8) What is your understanding of instruction being *learner-centered* in traditional classrooms? Do you believe you support learner-centered classroom? If yes, How?
- 9) Do you typically promote reflection of learning in traditional classrooms? How?
- 10) Do you try to conduct activities that build a classroom culture in traditional settings? How? In one word, could you describe this culture?
- 11) When seeking advice on content or pedagogy, what resource(s) do you typically seek (person, group, Internet, textbooks, etc.)?
- 12) In the traditional face-to-face setting, what roles do you feel you play as you lead a class? (instructor, researcher, student, liaison, proctor, assessor, expert, etc.)

13) Do you feel that you receive the support you need to grow and develop your teaching practices in traditional settings? Explain.

APPENDIX C

CLASSROOM OBSERVATION NOTES SAMPLE

## CLASSROOM OBSERVATION NOTES SAMPLE

Students: 12 female/1 male; CONFIGURATION: desks in a circle;  
8 students using administered iPads, others own devices or handwriting  
*Key: T = Technology, S = Semiotics, T/S = both*

### 11am

Discussing messages thru 3D Lab online. Students all logging onto their iPads.

T

Review calendar: career and resume topics, reading S

Discuss a conference she went to and what can be done with iPads. got an apple rep who is coming next thursday. T/S

Topic: career options (classroom teacher, therapist, OT, Child specialist, etc.) you need a plan and as you explore more options, interests grow. In 3D GameLab there are activities re careers, interviews, bureau of labor statistics (tracking jobs; median income, main duties, certifications required, work environment) Allowed to partner or not, but will share at the end of class T/S

3D Game lab: find 3 career paths, follow links, or can Google, other organizations, Monster, or discuss with peers T/S

\*Find two job listings that you would be qualified for right out of college (whatever degree is your goal) Find info, put notes into your iPad, collaborate with others  
T/S

### 11:17am

Activity above: Students browsing on iPads and talking to one another. 1/2 and 1/2. talkers are less on task than individuals on their iPads. T/S

Students asking B about where to look, and about interests leading them to certain career choices S

\*Student discussing education path toward career path. B tells her to look on Monster or OT asst. job listings and look at job requirements. Generalities get refined that way. What do you need to get to that point? T/S

\*"I didn't know there was so much I could do" looking at a site on the iPad. Student seems enthusiastic T/S \*\*\*\*\*

APPENDIX D  
REFLEXIVE JOURNAL PROMPTS

## REFLEXIVE JOURNAL PROMPTS

### Reflexive Journal Entry 1 (Factor 1: Digital-Age Work and Learning)

- A) Describe your comfortability with digital tools for instructional and/or assessment purposes.
- B) Do you believe you are an effective communicator and/or collaborator using digital tools? Why or why not?
- C) Do you use digital tools as a resource for learning? How?
- D) Do you use digital tools for analysis purposes? Why or why not?

### Reflexive Journal Entry 2 (Factor 2: Learning Experiences & Assessments)

- A) Do you use technology to construct knowledge and promote engagement for deeper understanding of content for your students? How?
- B) Do you use learner centered classroom activities? (If you do not, explain why? If you do, how do you employ these types of activities.)
- C) Are you using the iPad to facilitate any formative or summative assessment strategies? If so, how? If not, why not?

### Reflexive Journal Entry 3 (Factor 3: Student Learning & Creativity)

- A) Are you promoting *individual creativity* using the iPad in class? If yes, how? Do you have plans to do this in the future? How?
- B) Are you promoting innovative thinking & problem solving? (If you are not yet doing so, are you planning anything this semester in that respect? How are you visualizing these types of activities?)

C) Do you promote collaborative and community frameworks in your class (globally and locally)? (If you are not doing so, are you planning anything this semester in that respect? How are you visualizing these types of activities?)

Reflexive Journal Entry 4 (*Factor 4: Professional Growth & Leadership*)

A) How do you see the iPad helping you build *leadership skills* and *community* for your students, locally and/or globally? If you do not, why do you think this is the case?

B) Describe how you assist your students with improving their technology skills and/or using these tools in class.

Reflexive Journal Entry 5 (*Factor 5: Digital Citizenship & Responsibility*)

A) How would you describe digital citizenship and digital responsibility?

B) Do you promote digital citizenship, responsibility, and *netiquette* (digital etiquette) using iPads in the classroom? How?

C) Do you address diversity using iPads in the classroom? How?

D) Do you promote collaboration among diverse learners? How?

APPENDIX E  
DEBRIEFING SESSION NOTES SAMPLE

## DEBRIEFING SESSION NOTES SAMPLE

(recording on A's device began before my arrival)

### **10:10am**

Discussing some tech issues with students. Connectors, possible flash drive issue, links broken? Some files not readable in mac vs pc. Ordered Dongles for students. Also need keyboards and chargers for them. And a case for them. "If we could get a charging station for a total solution to that issue." (C)

There is also a separate set of iPads for a Collin College/TWU course (8 iPads). The intention is to eventually let them take these to classrooms in a practicum fashion. (B)

They are trying to figure out storage for the cart, more supplies, and have a dedicated tech room.

### **10:24am**

Discussed AR apps and the various ways it could be used for learning in various disciplines. (C)

Discussing publishing and one article C is doing is on iPads but the problem is that the tech will probably change by the time it's published.

They are reviewing notes. Lots of updating to do. 3 hours in one session. They are having to put in configurator (a shared model making all iPads the same) in a master computer to wipe and restore iPads. This is one reason why students cannot personalize iPads...they must be all the same thus the configurator. TECHNICAL

### **10:37am**

Discussing issues with switching to Canvas from BB. Pros and cons. (ABC)  
<https://utexas.instructure.com/courses/633028/pages/blackboard-vs-canvas-features>

A would like to use Google Classroom. Maybe for a hybrid 3663 class, and use ipads and translate it to mobile learning at a distance.

"That's what's missing...the personal aspect of it." (C) "We tried the GoogleClassroom pilot at UT and the icloud was an issue with so many accounts. But this may be where we bridge the shared device and the personal device through the cloud. Like with Google Drive." (C)

APPENDIX F  
INTERVIEW 2 PROTOCOL

## INTERVIEW 2 PROTOCOL

- 1) How did you evaluate the success or failure of a classroom activity using the iPad?
- 2) How did you assess student work and outcomes using the iPads? (output created, presented, and/or embellished using the iPads) (example, a live poll, activity, etc.)
- 3) Technology use is extremely varied among users. Did you address students in your class who were struggling with the iPad during classroom activities? How?
- 4) How did you plan classroom activities during this semester using the iPads?
- 5) Did you give students with iPads liberty in designing and executing assignments based on their individual interests, skills, and learning styles? How?
- 6) How did you determine whether the iPad would enhance a lesson, or if traditional methods might serve your purpose better?
- 7) Did you group students with iPads this semester? How did you group them?
- 8) What is your understanding of instruction being learner-centered in a classroom with student iPads? Do you believe you supported a learner-centered classroom? How?
- 9) Did you promote reflection of learning AND/OR iPad use this semester? How?
- 10) Did you try to conduct activities that built a classroom culture using the iPads? How? In one word, could you describe this culture?
- 11) When seeking advice on content or pedagogy using iPads, what resource(s) did you seek (persons, group, Internet, textbooks, etc.)?
- 12) In the classroom setting with iPads, what roles did you feel you played as you led your classes? (instructor, researcher, student, liaison, proctor, assessor, expert, etc.)

13) Do you feel that you receive the support you need to grow and develop your teaching practices using technology (not just the iPad)? Explain.

14) Describe how you see yourself as a resource to others who are curious about, or anticipating implementing iPads, after having completed a semester of students with iPads in the classroom?

15) What resources did you utilize during the semester using student iPads to support your instructional activities and fluidity with the device? Did this support help you accomplish your teaching and or learning objectives? Do you see yourself still needing this support in the future in regards to student iPad uses, or something more/less?

16) Describe your experiences sharing and debriefing with your colleagues during the semester?

17) Did the reflexive journal writing benefit you in any ways? HOW?

18) Did you face any barriers using the iPads? If so, what were they? Did you attempt to resolve them? How?

19) Do you think the iPads had any impact on your work flow? How?

20) Did you find that there were certain contexts in which the iPads were not appropriate? Explain.

APPENDIX G  
FOCUS GROUP DISCUSSION PROMPTS SAMPLE

## FOCUS GROUP DISCUSSION PROMPTS SAMPLE

In my observations I saw small group work very frequently using iPads for various reasons. The data reflected a strong intention for this course to include collaborative work in relation to building a community within the classroom. The data also reflects a strong association with your professor's collaborative experiences and intentions for collaboration to be part of her course, and her attempts to model digital age work and learning.

-Would you agree or disagree that there has been a lot of peer support and collaboration in this course?

-Was the design of collaborative activities I, NI, N?

-Would you agree or disagree that these activities helped in building a classroom culture, or community?

-(if applicable) Was the culture or community that grew in this course, mediated by the technology use, I, NI, N?

-Do feel that your professor modeled digital age work and learning by way of your collaborative work with each other and with her?  
Agree

-(If applicable) Would you consider this I, NI, N?

-Would you agree or disagree that your collaborative activities engaged you in your professional growth and leadership?

-(If applicable) Would you say that the iPad uses in your collaborative activities for developing your professional agendas and leadership skills were I,NI,N?

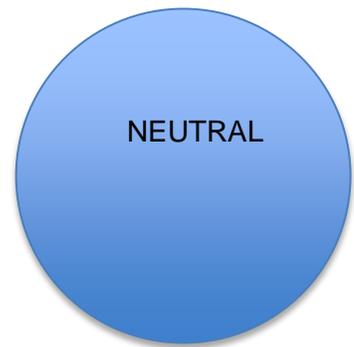
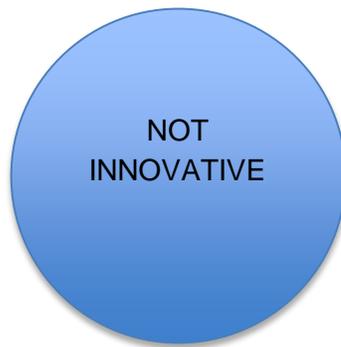
-What are your suggestions to improve in the area of collaborating to build community with your peers or professors using the iPads?

APPENDIX H  
TALLY SHEET FOR FOCUS GROUP COUNTS

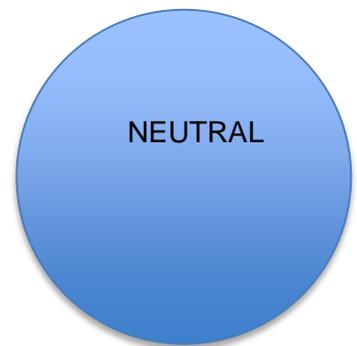
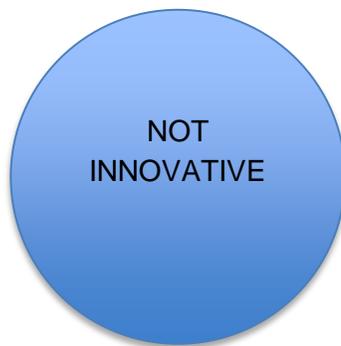
# TALLY SHEET FOR FOCUS GROUP COUNTS

## Focus Group Tally Chart

Q1



Q2



APPENDIX I  
RESEARCHER REFLECTION SAMPLE

## RESEARCHER REFLECTION SAMPLE

The nature of the course allows for iPad use as a resource far greater than the other A course I observed. This brings in the contextual/situational topic in research using mobile devices for teaching and learning. This class had a good amount of collaboration and discussion on meaningful topics but used technology as the tool to get information to flesh out understanding of career options.

B served as a resource to expound on what students were finding on the various websites they visited re career opportunities but this was a very independently run class with the iPads as key components.

??? I wonder if this class could have elicited as much information as it did if it weren't for the iPads? When it came time to share within groups, the iPads took on a secondary position to talking.

Some students still took hard copy notes on what they found on their searches.

APPENDIX J  
RECRUITMENT FLYER

## RECRUITMENT FLYER



STUDY TITLE:

**CONNECTING UNIVERSITY EARLY CHILDHOOD AND FAMILY EDUCATORS' EXPERIENCES WITH STUDENT IPADS THROUGH DIALOGICAL POSITIONING TO SHIFTING PEDAGOGIES AND CULTURES**

THIS STUDY AIMS TO CONNECT EDUCATORS TEACHING PRACTICES WITH THE NEWLY ACQUIRED STUDENT IPADS TO YOUR THOUGHTS ABOUT THE COURSES USING THEM.

\*\*\*PARTICIPATION IS COMPLETELY VOLUNTARY!\*\*\*

**FREE PIZZA LUNCHES AND RAFFLE TO WIN A \$50 GIFT CARD!!**

PARTICIPATION ENTAILS TWO 30-MINUTE GATHERINGS IN OPEN FORUM DISCUSSIONS IN CLASS IMMEDIATELY FOLLOWING YOUR CLASS SESSION.

**TO PARTICIPATE, CONTACT:**

NICOLE MASEK, M.A. (DOCTORAL CANDIDATE)

NMASEK@TWU.EDU

(972)757-0624 (TEXT OR CALL)

(There is potential risk of loss of confidentiality in all email, downloads, and internet transactions. Confidentiality will be protected to the extent that is allowed by law.)

APPENDIX K

FOCUS GROUP RECRUITMENT TRANSCRIPT

## FOCUS GROUP RECRUITMENT TRANSCRIPT

You have probably noticed me in your class observing for the last several weeks. I have been collecting data for my dissertation that is titled:

Connecting University Early Childhood & Family Educators' Experiences with Student iPads Through Dialogical Positioning to Shifting Pedagogies and Culture

These are all fancy words that basically mean I am trying to make a connection between professors who are choosing to implement iPads into their courses, how it shifts their teaching practices, and ultimately, whether you believe what you witnessed and experienced was innovative or not. Did the iPads contribute to your learning this last semester and how?

I am looking for participants for a focus group to discuss using the student iPads this last semester. I have three professors all implementing iPads into their courses, so I need students from each of these courses to provide their thoughts and opinions about various aspects of using the iPads in their classes so we can get your perspective.

Participating in the focus group will consist of two 30-minute gatherings here immediately following your class. There will be pizza provided for all who attend and a drawing to win a \$50 gift card at the end of the second gathering!

I have a recruitment letter here for you to read the details of this study. It has my contact information if you have any questions or comments. I will also send out a recruitment email this week with the consent form attached. Everyone who agrees to participate will need to sign a consent form. I have some here if you decide to participate now, or you can decide later and give it to me at the gathering.

Your professor will not have any access to any information you provide. All contributions will be anonymous, as I am not identifying any of you by name, but by your professor. All consent forms or any other identifiable data will be coded and stored either in a password-protected database, or in a fingerprint secure safe in my office. This will have zero bearing on your grades, points, or participation in your course.

I have provided a flier for you all and another placed in the hallway so if you need a quick reminder or information to share with your peers, it will be there for the next couple of weeks. It has my contact info in case you misplace these forms and need new ones.

APPENDIX L

FOCUS GROUP RECRUTIMENT LETTER

## FOCUS GROUP RECRUITMENT LETTER

**Principal Investigator:** Nicole Masek, MA,

**Contact Information:** NMasek@twu.edu (972) 757-0624

**Advisor:** Sharla Snider, PhD, (940) 898-2685

**Title of Study:** *Connecting University Early Childhood and Family Educators' Experiences With Student iPads Through Dialogical Positioning to Shifting Pedagogies and Culture*

I am conducting a dissertation study on the impact of educator experiences innovating their teaching practices with student iPads this Fall 2015 semester, and the effects on student opinions of an emerging culture of innovation at TWU. This study aims to connect educators teaching practices with the newly acquired student iPads to your thoughts about the courses using them.

To collect data on student opinions I am forming three focus groups (one per instructor using the iPads in their classroom instruction). You will be responding to questions posed to the group in two 30-minute open discussions. These sessions will be recorded for accurate transcription and discussion dynamics.

There will be only two 30- minute gatherings held immediately after your regular class ends in the same room, discussing your experiences learning with iPads. The principal researcher will take notes during the discussion and filling out a Venn Diagram to tally the number of students who believe a particular classroom activity being discussed was "Innovative," "Not Innovative," or "Neutral". A debriefing session will take place at the end portion to ensure the researcher's notes match your opinions, and to take questions.

Your participation in this study is voluntary and you may withdraw *at any point*. All data will be kept confidential, and your identity will be coded to maintain confidentiality. There is potential risk of loss of confidentiality in all email, downloads, and internet transactions. Confidentiality will be protected to the extent that is allowed by law. All data for this study is stored in a password-protected database accessible only by the principal researcher, and any hard copies and videos are stored in a fingerprint-secure safe accessible only by the principal researcher. All data will be deleted or shredded by 2020.

Your instructors will not be in attendance, will not have access to the data collected (video, audio, Venn Diagram), and will not be informed of who is participating, therefore, there is no risk of impact to grades, class participation points, or any coursework what-so-ever.

The benefits to participating in this study are the experience of being in a study contributing to the literature on effective innovation tactics with student iPads so TWU may have more grounds to support more courses with these technologies, as well as FREE PIZZA LUNCHES and a chance to win a \$50 gift card at the end of the second Focus Group gathering!

**To participate in this study**, please fill out the consent form provided by me, let me know when you see me in your next classroom observation, or email me at: [NMasek@TWU.edu](mailto:NMasek@TWU.edu), and I will send you a copy of the consent for to bring with you to the gathering. I appreciate your participation in the focus group and please let me know if you have any questions.

APPENDIX M  
STAMPED STUDENT CONSENT FORM

# STAMPED STUDENT CONSENT FORM

## CONSENT FORM

### TEXAS WOMAN'S UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

**Title:** Connecting University Early Childhood and Family Educators' Experiences With Student iPads Through Dialogical Positioning to Shifting Pedagogies and Culture

**Investigator:** Nicole Masek, M.A., Doctoral Candidate.....[NMasek@TWU.edu](mailto:NMasek@TWU.edu), 972-757-0624

**Advisor:** Sharla Snider, PhD.....[SSnider@TWU.edu](mailto:SSnider@TWU.edu), 940-898-2685

#### Explanation and Purpose of the Research

You are being asked to participate in a research study for Nicole Masek's dissertation at Texas Woman's University. The purpose of this research is to determine if, how, and what experiences teaching and learning with iPads in the classroom contribute to shifting teaching practices and/or a shifting culture of innovation at your university. You have been asked to participate in this study because you are a student in one of the courses using the student iPads under the instruction of one of the faculty-participants OR you are one of the faculty members integrating iPads into your course Fall 2015 semester.

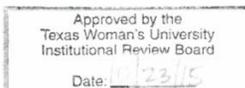
#### STUDENTS: Description of Procedures

As a student-participant in this study you will also be asked to contribute to *two 30-minute open forum focus group discussions* immediately following your class in the same room to discuss your experiences and opinions about learning with iPads. I, Nicole Masek, will conduct the focus group gathering that will be recorded (video & audio) for accurate transcription purposes. At the end of the gathering, I will review the main points to verify the data. You may also contribute as much or as little as you choose during the gathering. To be a participant you must be at least 18-years-old and be enrolled in one of the courses using student iPads.

#### Potential Risks

As a member of a focus group, anonymity cannot be guaranteed as it is an open forum discussion among your peers. Should you decide to withdraw at any point, you may do so without any penalty what-so-ever.

Coercion is a potential risk. To minimize this risk, professors are *not informed* of any student-participants, therefore, no grades, points, or credit will be impacted by participating. Additionally, recruitment and consent form distribution and collection will take place once the professor has left the classroom. Consent forms, emails, and other identifiable data will be stored in a secure location, accessible only by me, Nicole Masek.



\_\_\_\_\_  
Initials  
Page 1 of 2

Loss of confidentiality is a risk. Confidentiality will be protected to the extent that is allowed by law. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. All data collected will be coded according to the type of data and date, stored in a secure location, and only accessible by me, Nicole Masek. Students will not be identified individually, but rather as a student of a specified professor. All hard copy data will be deleted or shredded within 5 years of the study's completion. The results of the study will be reported in scientific magazines or journals omitting all identifiable data.

Should any participant become uncomfortable for any reason, he or she may terminate their participation at any time without penalty what-so-ever. All study venues will be in a familiar location on campus to provide as much comfortability as possible.

Participation and Benefits

**FREE PIZZA LUNCHES PROVIDED DURING EACH GATHERING!  
A DRAWING TO WIN A \$50 GIFT CARD AT THE COMPLETION OF THE SECOND  
GATHERING!!**

(Each gathering attendance gets you an entry to win.)

Your involvement in this study is completely voluntary and you may withdraw from the study at any time. Research details will be at your disposal once analysis is complete after December 2015. This will include a description of your contribution to the study and findings.

Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep for your records. If you have any questions about the study you can contact me, Nicole Masek, by phone, email, or face to face on campus at TWU, Denton. Contact information is provided at the top of this form. If you have questions about your rights as a participant or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via email at [IRB@TWU.edu](mailto:IRB@TWU.edu).

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\*If you would like to know the results of this study, tell me where you would like them to be sent:

Email: \_\_\_\_\_

or

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Approved by the  
Texas Woman's University  
Institutional Review Board  
Date: 10/23/15

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APPENDIX N

DISSERTATION STUDY IRB SIGNATURE PAGE

## DISSERTATION STUDY IRB SIGNATURE PAGE



**Institutional Review Board**  
Office of Research and Sponsored Programs  
P.O. Box 425619, Denton, TX 76204-5619  
940-898-3378  
email: IRB@twu.edu  
<http://www.twu.edu/irb.html>

DATE: October 23, 2015

TO: Ms. Nicole Masek  
Family Sciences

FROM: Institutional Review Board (IRB) - Denton

Re: *Approval for Connecting University Early Childhood and Family Educators' Experiences with Student iPads through Dialogical Positioning to Shifting Pedagogies and Culture (Protocol #: 18546)*

The above referenced study has been reviewed and approved by the Denton IRB (operating under FWA00000178) on 10/23/2015 using an expedited review procedure. This approval is valid for one year and expires on 10/22/2016. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Karen Petty, Family Sciences  
Dr. Sharla Snider, Family Sciences  
Graduate School