2019

Professional learning in the digital age: a phenomenological study on the lived experiences of educators' participation in programs sponsored by technology vendors

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PROFESSIONAL LEARNING IN THE DIGITAL AGE: A PHENOMENOLOGICAL STUDY ON THE LIVED EXPERIENCES OF EDUCATORS' PARTICIPATION IN PROGRAMS SPONSORED BY TECHNOLOGY VENDORS

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Learning Technologies

by

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August, 2019

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DEDICATION

This dissertation is dedicated to all of the teachers who are making a difference in the lives of students. May you find value in the research being conducted to improve professional learning opportunities and support continued progress in the field in education.

ACKNOWLEDGMENTS

I am extremely grateful for the mentoring and guidance that was provided by my chair, Dr. Judith Kledzik Fusco and committee members, Dr. John Ittelson and Dr. Linda Polin. I am also appreciative of my parents for continuously believing in me and instilling a love of learning. Lastly, thank you to my amazing husband, Patrick for encouraging me to pursue my educational endeavors. I would not have been able to enroll in this prestigious doctoral program and endure all of the challenges without your patience, love, and support.

VITA

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Kelley, C. (2017). *Creating a Virtual Community of Practice in Teacher Education.* Submitted for presentation at the Mobile Technology in Teacher Education Conference. Los Angeles, CA: January 13-14.

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ABSTRACT

This qualitative phenomenological study examines the lived experiences of six educators who have earned titles (e.g. *Apple Distinguished Educator, Google Certified Innovator,* and *Microsoft Innovative Educator Expert*) and participated in technology vendor-sponsored professional development programs. The theoretical lens of identity was used to understand educators' experiences and status change upon earning prestigious titles. Specifically, this study aimed to better understand how educators' interactions and participation in these programs shaped the trajectory of their professional lives and teaching practice with regard to technology integration. Data was collected through semi-structured interviews and analyzed following a transcendental phenomenology process in order to describe the lived experiences of all participants by reducing individual experiences to a collective story.

Results from this study help to fill a gap in the literature concerning professional development programs sponsored by technology-vendors and what participation in them entails by providing first-hand accounts of classroom educators' experiences. Little research has focused on this phenomenon and results reveal how educators position their experiences relative to traditional district professional development opportunities. Educators' accounts also offer further insight into their attitudes, beliefs, and motivation for competitively pursuing participation in these programs and how these experiences have transformed their teaching and mentoring practices. Furthermore, results highlight the advantages of school and business partnerships to support professional learning by providing a better understanding of how these programs are structured and describing specific innovative strategies being implemented that can benefit the field of education.

Chapter One: Study Introduction

Technology has transformed how people learn, providing instant access to information with further opportunities for global interactions, collaboration, networking, and problem solving. It empowers users to complete tasks with greater efficiency, while digitally connecting with others to increase productivity and creativity. Today's learners require media literacy to better understand the communications that shape our society, and technology must be integrated into the contemporary education landscape in order to equip students for the 21st century and beyond (Freeman, 2017; International Society for Technology in Education [ISTE] 2016; Jenkins, Katie, Purushotma, Robinson, & Weigel, 2006; U.S. Department of Education, 2016). Hence, we must ensure that all teachers are adequately prepared to meet the instructional and technological needs of students. Most importantly, teachers must build a repertoire of effective pedagogical practices with technology integration that promote learning. To guide teachers with this endeavor, they need effective professional development with sustained support (Ertmer, 1999, 2005; O'Neal, Gibson, & Cotten, 2017; Tondeur, Forkosh-Baruch, Prestridge, Albion, & Edirisinghe, 2016; Twining, Raffaghelli, Albion, & Knezek, 2013; Zhao, 2003).

There is a unique phenomenon occurring in education where large technology companies or vendors such as Apple, Google, and Microsoft are recruiting educators to participate in professional development programs designed to promote technology integration in their practice. Interested educators are required to submit an application that showcases their proficiency with the vendors' products in support of students' learning. If their application is accepted, they earn a prestigious title (e.g. *Apple Distinguished Educator, Google Certified Innovator*, and *Microsoft Innovative Educator Exper*t) as a form of recognition (Apple Education, 2018, Google for Education, 2018; Microsoft Educator Community, 2018; Singer, 2017). Those who are

competitively selected also earn the opportunity to participate in these programs, where they can learn more about new products and how to creatively teach with them. Additionally, educators are given autonomy of their own professional learning goals and choice about specific skills they wish to develop.

While the companies aim to sell their products to schools, they have also demonstrated a commitment to supporting teacher and student learning with technology integration. Over the years, they have partnered with education leaders and conducted research studies to explore contemporary pedagogical practices that will ultimately impact the new generations of users (Apple Education, 2018, Baker, Gearhart, & Herman, 1985; Dwyer, 1994, 1995; Google for Education, 2018; Ishizuka, 2004; Microsoft Educator Community, 2018; Microsoft Peer Coaching Program, 2015; Ringstaff & Kelley, 2002). They have also built collaborative communities and their own institutes or academies to promote continued professional learning. This study aims to understand why educators are drawn to participate and earn titles in such programs and what their experiences have been as a result. Specifically, it examines how educators' professional identities change upon earning titles and participating in the programs.

There are numerous ways to approach technology related professional development, although most traditional models used in schools have been proven to be ineffective. These highly structured models tend to focus on hardware or software in a "technocentric" (Papert, 1987) manner, rather than on how to teach with technology. Teachers' individual skills and needs are not considered and as a result, they view this training as a "one-size-fits all" compliance exercise rather than a learning experience (Bill & Melinda Gates Foundation, 2014; Darling-Hammond, Hyler, & Gardner, 2017; Darling-Hammond & Mclaughlin, 1995; Desimone

& Garet, 2015; Wei, Darling-Hammond, & Adamson, 2010; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007).

More recently, there has been a paradigm shift in education acknowledging that teachers are continuous learners and they need opportunities to grow within the practice. Research confirms that teacher learning occurs through collaboration with other teachers (Battey & Franke, 2008; Bransford, Brown, & Cocking, 2000; Fishman, Davis, & Chan, 2014; Shulman & Shulman, 2004) and by participating in authentic activities that are situated in schools and classrooms (Borko, 2004; Darling-Hammond & Richardson, 2009; Fishman et al., 2014; Lieberman, 1995; Lieberman & Miller, 2008, 2011, 2016). This includes informal interactions with colleagues that promote knowledge sharing, which may occur in schools and across online spaces (Carpenter, Trust, & Krutka, 2016; Hoekstra, Beijaard, Brekelmans, & Korthagen, 2007; Jones & Dexter, 2014; Jurasaite-Harbison & Rex, 2010, 2013; Lieberman, 2000; Trust, 2012, 2016).

Contemporary models of professional development emphasize social and situated learning theories such as: *informal* and *self-directed learning*, *peer-to-peer learning*, *mentoring, coaching, apprenticeships*, and participation in *communities of practice*- CoPs, *professional learning communities*- PLCs, and *professional learning networks*- PLNs (DuFour, 2004; Feiman-Nemser, 2001; Eraut, 2000; Hord, 2008; Knight, 2009; Lave & Wenger, 1991; Lieberman, 2000; Lieberman & Miller, 2016; Showers, 1984; Trust, 2016). Many of these models have been used for technology training, but there are inconsistencies with how the models are implemented and if they address teachers' individual needs—let alone provide them choice in what they wish to learn about (Ertmer, 2005; Hew & Brush, 2007; Polly & Hannafin, 2010; Tondeur et al., 2016; Twining et al., 2013). Furthermore, teachers may develop new

technical skills, but they struggle to change deeply ingrained instructional practices. They often have difficulty with advancing students' higher order thinking with technology as a learning tool. Inadvertently, teachers use technology to replace old teacher-centered practices rather than optimizing students' learning with constructivist methods. As a result, technology has not lived up to its potential of transforming education (Culp, Honey, & Mandinach, 2003; Hew & Brush, 2007; Twining et al., 2013; Tondeur et al., 2017; U.S. Department of Education, 2016).

Ertmer (2005) describes *technology integration* as "facilitating uses of technology that lead to increased student learning" (p. 28). According to Hixon and Buckenmeyer (2009), true technology integration is "a seamless, effective, and efficient incorporation of technology into daily routines and instructional practices" (p. 132). The *Intel Teach* Program (2011) similarly defines *technology integration* as "the process of teachers and students routinely and seamlessly using technology resources and technology-based practices to enhance learning" (p. 2). Likewise, Liu, Ritzhaupt, Dawson, & Barron (2017) define it as, "using technology in K-12 classrooms to support a variety of instructional methods," although they also include teachers' instructional preparation (p. 798). Throughout this dissertation, the term *technology integration* will be used to describe how teachers are routinely using technology as an instructional tool with students to enhance learning.

New methods for teaching and learning with technology show the importance of thinking about the powerful triad of pedagogy, content, and technology. Building on Shulman's (1986) theory of "Pedagogical Content Knowledge" (PCK), Koehler and Mishra (2005) introduced the "Technological Pedagogical Content Knowledge" (TPACK) framework by adding a technology domain. This framework proposes that teachers must develop expertise in each area individually (*pedagogy, content,* and *technology*), while also knowing pedagogical practices for educational

technologies and how they best fit into each content area (p. 132). In other words, teachers must understand that these spheres of domain knowledge have a mutually mediated impact (Koehler & Mishra, 2005; Unger & Tracey, 2013; Zhao, 2003). Therefore, effective professional development for technology integration must not only introduce new technologies from a technical standpoint, but it should also focus on how to successfully integrate them within other elements of instruction. Strategies should additionally include opportunities for teachers to plan lessons together that include technology, to observe other teachers modeling effective practices, and coaching or mentoring one another (Barron, Dawson, & Yendol-Hoppey, 2009; Beglau, Hare, Foltos, Gann, James, Jobe, Knight, & Smith, 2011; Freeman, Adams Becker, Cummins, Davis, & Hall Giesinger, 2017; Garmston, 1987; Glazer & Hannafin, 2006, 2008; Kopcha, 2012). Moreover, researchers advocate that teachers must be empowered and given choices about what skills they wish to improve, especially because there are varying levels of technology adoption and expertise (LoTi 2016). Thus, when teachers' needs are addressed, this will help to build their confidence and self-efficacy, which also has a direct impact on how technology is integrated in their classrooms (Ertmer & Ottenbreit-Leftwich, 2010, 2013; Kim, Kim, Lee, Spector, & DeMeester, 2013; Kopcha, 2012; O'Neal et al., 2017; Tondeur et al., 2017).

We have gained further insight about how to improve professional development models for teachers with regard to technology integration, yet change has been a slow process and problems continue to persist due to varying opportunities and inconsistencies across schools (Bradshaw, 2002; Ertmer, 2005; Hew & Brush, 2007; Holmes, Vargas, Swan, Jennings, Meier, & Rubenfeld, 2002; Mouza, 2002; Polly & Hannafin, 2010; Tondeur et al., 2016; Twining et al., 2013). Consequently, many teachers are turning to their professional networks and accessing resources across online spaces for guidance. They are engaging in webinars, virtual lectures,

Massive Open Online Courses (MOOCs), micro-credential programs, and unconferences such as *Edcamps* or other informal learning opportunities that may not be offered in schools. Furthermore, they are participating and earning digital badges or prestigious titles in professional development programs sponsored by technology vendors to increase their proficiency with classroom technology integration (Carpenter et al., 2016; CTQ & Digital Promise, 2016, 2017; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; Singer, 2017; Trust, 2012, 2016; U.S. Department of Education, 2016). In order to keep making strides in education, we need to better understand this phenomenon and how teachers' participation in these programs shapes the trajectory of their professional lives and teaching practices.

Statement of the Problem

The United States education system is challenged by a gap between the potential use of technology in schools for learning and how it is actually integrated in schools. Over the years, many teachers have reported not feeling prepared to use technology effectively within their instruction to support students' learning, expressing the need for appropriate training and sustained support with integration into curriculum (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Hixon & Buckenmeyer, 2009; O'Neal et al., 2017; Tondeur et al., 2016). In fact, education technology has been a major focus of reform and policy at the federal level, as well as at state and local levels, for at least 30 years, with several initiatives aimed toward understanding how best to use technology to improve teaching and learning (Culp et al., 2003). Despite these initiatives, teachers continue to need further opportunities for professional development that are situated in the practice and include time to collaborate with colleagues (Bradshaw, 2002; Ertmer, 1999, 2005; Ertmer & Ottenbreit-Leftwich, 2010, 2013; Freeman et

al., 2017; Glazer, Hannafin, Polly, & Rich, 2009; Polly & Hannafin, 2010; Kopcha, 2012; Tondeur et al., 2016).

As discussed earlier, most traditional professional development models are criticized for using a "one-size-fits all" approach that does not consider teachers' needs or interests (Darling-Hammond, 2009; Darling-Hammond et al., 2017; Desimone & Garet, 2015; Lieberman, 1995, 2000; Wei et al., 2010; Wei et al., 2009). One symptom is when professional development is designed specifically for technology, workshops tend to focus on the software or hardware itself with little to no connections made to pedagogy and learning theories. As a result, teachers have difficulty knowing how to best integrate technologies within their instruction. Another challenge is that teachers possess varying proficiencies and comfort levels with technology, which means they benefit from more individualized support. Consequently, the overarching problem is that teachers are not given choices about what skills they wish to develop and how they prefer to learn when improving their practice. Since traditional professional development models do not account for this, teachers are often forced to explore alternate options outside of their schools and districts. Moreover, several online programs offered by third parties (including technology vendors) have been known to incorporate innovative teaching methods with emerging technologies that are not common in traditional professional development. New formats may include online discussion forums, ebooks, videos, podcasts, webinars, repositories of resources, and even digital badges, microcredentials, or other forms of recognition for learning achievements (Beach, 2017; Corcoran & Quattrocchi, 2014; CTQ & Digital Promise, 2016, 2017; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; Singer, 2017; Trust, 2012, 2016; U.S. Department of Education, 2016). Exploring teachers' experiences in these programs may provide further insight on what benefits they feel are gained by pursuing titles that

shape their professional identities. It may also shed light on their motivation for participating in this form of professional development and provide an understanding of how it affects their teaching and mentoring practices with regard to technology integration.

Purpose of the Study

The purpose of this phenomenological study was to understand the lived experiences of educators who have earned titles (e.g. *Apple Distinguished Educator*, *Google Certified Innovator,* and *Microsoft Innovative Educator Expert*) and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. A phenomenological research design was implemented since all participants shared a common experience of the phenomenon when they applied and were selected to participate in these unique programs (Creswell, 1998, 2014; Moustakas, 1994; Seidman, 2013; van Manen, 1990). Their experiences and status change were then examined with an identity lens (Wenger, 1998). Specifically, this study sought to understand how educators' professional identities changed upon earning prestigious titles from technology vendors for recognition of their skills with technology integration, why they were motivated to acquire new statuses and participate in these programs, what it means to have such titles, how they are being used within or outside of the teaching practice, and what innovative professional learning methods they have experienced as a result of participating in these unique programs. For the conceptual framework, an identity lens was used to explore the professional identities of educators who have participated in the programs (Wenger, 1998).

Research Question

This investigation will be guided by the following research central research question: *What are the lived experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?*

Significance of the Study

Schools are often limited in the funding they have for professional development and offer varied learning opportunities based on the resources they have access to. As a result of this and other factors, some teachers are turning to vendor-sponsored programs designed to promote technology integration in their practice. While many of these programs simply require completing an assessment to demonstrate skills with the vendors' products to earn a badge, certification, or title (e.g., *Apple Teacher, Google Certified Educator,* and *Microsoft Innovative Educator*), there are also highly competitive aspirations to pursue. Several programs offer more prestigious titles (e.g. *Apple Distinguished Educator, Google Certified Innovator,* and *Microsoft Innovative Educator Expert*) upon being selected to participate. To be considered, teachers must complete the entry badge or certification level requirements, submit an application which includes a presentation or video highlighting their innovative uses of the vendors' technology products in education, join a cohort of other new candidates and experienced participants in academies or institutes which are typically held in person across various locations, and continue to contribute within the community. Contributions may include developing innovative school-based technology projects, presenting at conferences, publishing educational resources, and offering insight on new products and tools for education. The application process is extremely competitive and only a limited number of educators are selected to join. Furthermore, new cohorts are only created on an annual basis with structured application deadlines leading up to them. Despite these challenging requirements and commitments, there are educators who are motivated to pursue the opportunity to participate and earn titles in these programs. Accordingly, there are an estimated 2,584 *Apple Distinguished Educator*s, 1,700 *Google Certified Innovators*, and 8,000 *Microsoft Innovative Educator Experts* worldwide as of the 2017-2018 academic year

and these may be under-estimates of the total number of participating educators (Apple Education, 2018, Google for Education, 2018; Microsoft Educator Community, 2018).

The primary goal of this study was to better understand educators' lived experiences as participants in technology vendor-sponsored programs, particularly because there is limited research on this phenomenon. Results from this study reveal how educators position these experiences relative to traditional district professional learning opportunities. Additionally, educators' accounts offer further insight into their attitudes, beliefs, and motivation for competitively pursuing participation in these programs and an understanding of their trajectories upon earning prestigious titles from them. Educators' authentic examples and artifacts shared also illustrate the professional benefits they feel are gained with technology integration skills and how these overall experiences transpire into their teaching and mentoring practices.

Another goal of this study was to help schools and districts to learn more about how these programs work and what innovative strategies for professional learning are being implemented that can benefit the field of education. This includes providing a better understanding of: how titles or other digital badges are earned and what they mean in these communities (and outside of them), how the programs are structured with face-to-face and online components, what level of involvement is required to maintain membership, and what resources and support are given for expanding educators' technology integration skills—including a description of what their interactions with technology vendors look like. Results additionally highlight the advantages of school and business partnerships to support professional learning.

Theoretical significance. This study will investigate the experiences of educators who earn titles and participate in vendor-sponsored programs, what this looks like, and what it brings to the practice. A sociocultural perspective of identity (Wenger, 1998) will be used as the theoretical framework while examining educators' experiences. Through an identity lens, the study aims to better understand how educators' interactions and participation in these programs are shaping the trajectory of their professional lives and teaching practice with regard to technology integration.

Assumptions and Delimitations of the Study

Assumptions. At the onset of this study, the researcher assumed that teachers who volunteered to be interviewed had in fact earned titles and participated in a professional development program sponsored by at least one of the focus technology vendors (Apple, Google, or Microsoft*)* and that they would provide honest and candid answers in their interview responses. Another assumption was that although participants had a range in their years of teaching experience and abilities to integrate technology within their teaching practices, they would openly share their experiences from participating in these programs and discuss what they perceived as the benefits. The researcher also assumed that some teachers may have only participated in the programs to fulfill school or district training requirements depending on what technology vendors are currently providing hardware/software where they are teaching and as a result, they may not identify benefits from participation in these programs or they may have negative opinions toward particular vendors and products. Furthermore, the researcher assumed that some teachers may have only earned titles for recognition or participated in the programs to pursue consulting opportunities outside of the classroom, which will not provide insight into how it has impacted their teaching practice with regard to technology integration.

Delimitations. All research participants in this study were multiple-subject credentialed teachers working in K-6 classrooms, who have earned titles and participated in a professional development program sponsored by at least one of the focus technology vendors (Apple, Google, or Microsoft). Their participation in the study was completely voluntary. Any multiple-subject credentialed teachers in K-6 who have not earned titles or participated in these programs were not interviewed. Moreover, single-subject credentialed teachers, instructional coaches, administrators, and higher education faculty members who have earned titles and participated in these programs were not interviewed.

Chapter Summary

As a result of varying opportunities for professional development in schools and inconsistencies with how they are implemented, teachers continue to need guidance on integrating technology to support students' learning (Bradshaw, 2002; Ertmer, 2005; Hew & Brush, 2007; Holmes et al., 2002; Mouza, 2002; Polly & Hannafin, 2010; Tondeur et al., 2016; Twining et al., 2013). Guidance can come in many forms that may include: peer collaboration, observation of other teachers, feedback from a more knowledgeable other such as a mentor or academic coach, online resources, networking, and participation in professional development programs offered by third parties such as technology vendors.

This phenomenological study sought to understand the lived experiences of educators who have earned titles and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. One goal was to gain further insight into educators' attitudes, beliefs, and motivation in order to provide a better understanding of their reasons for competitively pursuing participation in these programs and an understanding of their trajectories upon earning prestigious titles from them. Another goal was to help educators and stakeholders to learn about how these programs work and to discover what innovative

professional learning methods are supporting their technology integration skills in order to substantiate the advantages of school and business partnerships. Lastly, the study aimed to provide technology vendors with a better understanding of what educators are taking away from their experiences within these programs.

Organization of the study. Chapter one discussed the need for this research by outlining the problems faced with professional development for technology integration in schools. After highlighting a brief overview of traditional and contemporary models of professional development for contextual background, Chapter one presented the: problem statement, purpose of the study, research question, significance, assumptions, limitations, and delimitations of the study.

Chapter two provides a detailed literature review focused on professional development in education. It begins by examining educators' professional identities and the impact of identity on their practice. It also discusses how traditional and contemporary models of professional development have been used to support technology integration in schools. The chapter concludes with an overview of innovative professional development methods with technology, such as digital badges, which can be earned in programs sponsored by technology vendors. Additionally, each focus technology vendor, Apple, Google, and Microsoft is highlighted with a description of the programs currently offered for professional learning.

Chapter three is the methodology of the study and provides a detailed explanation of the study design, sources of data, human subjects considerations, data collection, procedures for analysis, and a description of the measures taken to ensure for validity and reliability. Chapter four illustrates the study findings with a detailed analysis of the data collected through semi-

structured interviews. Chapter five presents a final discussion of the study including implications and suggestions for further research.

Chapter Two: Conceptual Foundation

This dissertation is focused on understanding the lived experiences of educators who have earned titles (e.g. *Apple Distinguished Educator*, *Google Certified Innovator,* and *Microsoft Innovative Educator Expert*) and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. Chapter two begins with a discussion on educators' professional identities, which will be used as a theoretical lens in this study. It examines how identity influences educators' professional learning in the practice while explaining the need for continuous professional development. Additionally, it describes traditional models of professional development for technology integration. Following this, the literature review summarizes a paradigm shift in professional development with an emphasis on situated and social learning theories that includes an account of new recommendations for technology integration and contemporary models of professional development such as: (a) *informal learning*, (b) *peer-to-peer learning*, (c) *mentoring, coaching*, and *apprenticeships*, (d) *communities of practice*-CoPs, and (d) *professional learning communities*-PLCs. Finally, this chapter examines professional learning in online spaces that encompass teacher networks and innovative professional development methods with technology including digital badges for learning achievements and education technology programs sponsored by the focus technology vendors (Apple, Google, or Microsoft).

Educators' Professional Identities

> Teacher professional identity stands at the core of the teaching profession. It provides a framework for teachers to construct their own ideas of how to be, how to act, and how to understand their work and their place in society. Importantly, teacher identity is not something that is fixed nor is it imposed; rather it is negotiated through experience and the sense that is made of that experience. (Sachs, 2005, p. 15)

Teachers are continuously learning and developing as professionals in order to increase their knowledge, enhance classroom instruction, and to positively impact student achievement. Professional identity can be viewed as the ongoing process of *who a teacher is* and *who they want to become* (Beijaard, Meijer, & Verloop, 2002). In other words, a teacher's identity simultaneously influences their professional goals and is how they make sense of themselves as teachers (Beijaard et al., 2002; Coldron & Smith, 1999). According to Hammerness and colleagues (2005):

> Developing an identity as a teacher is an important part of securing teachers' commitment to their work and adherence to professional norms… the identities teachers develop shape their dispositions, where they place their effort, whether and how they seek out professional development opportunities, and what obligations they see as intrinsic to their role (p. 383–384).

The pathway to become a teacher includes professional training and also follows an apprenticeship model where mentors are often assigned for support during each stage of development, which include: pre-service preparation, induction into teaching, and ongoing mastery. Correspondingly, teachers' identities are crafted via interactions with their mentors and other colleagues, first hand experience in their own classrooms, and through continuous learning opportunities that occur in the practice and broader contexts (Battey & Franke, 2008; Beijaard et al., 2002; Feiman-Nemser, 2001; Fishman et al., 2014; Hammerness et al., 2005; Sachs, 2005). This learning trajectory includes developing teachers' *knowledge-for-practice* (formal knowledge and theory), *knowledge-in-practice* (practical knowledge), and *knowledge-of-practice* (knowledge based on experience), which are integral to teaching (Cochran-Smith & Lytle, 1999, p. 250). Studies have also explored the intersection of *pedagogy* (knowledge about teaching), *content* (knowledge about specific subjects taught) and *technology* (TPACK), as a conception of

teacher learning for technology integration (Koehler & Mishra, 2005; Harris, Mishra & Koehler, 2009; Thompson & Mishra, 2007).

From a sociocultural perspective, learning to teach is a social process and professional identities are transformed through participation in cultural practices and communities (Battey & Franke, 2008; Holland, Lachicotte, Skinner, & Cain, 2001; Lave & Wenger, 1991; Lave, 1996; Sfard & Prusak, 2005; Wenger, 1998). Lave (1996) states how, "becoming more *knowledgeably skilled* is an aspect of participation in social practice… who you are becoming shapes crucially and fundamentally what you know" (p. 57). In the social context of teaching, knowledge is developed through active participation in multiple *communities of practice* (CoPs), where teachers work together to pursue common goals or shared enterprises over time (Lave & Wenger, 1991; Wenger, 1998). By participating in multiple communities of professionals, a teacher's identity is constantly shaped and reshaped (Beauchamp & Thomas, 2009). Battey and Franke (2008) discuss how, "teaching is a process of becoming a member in a defined group of practitioners with specific skills, with the important marker of learning being the adoption of an identity as a full member" (p. 128). Therefore, as teachers become full members or *legitimate peripheral participants* in the community, they shift from *newcomers* to *old-timers*, which leads to the mastery of new knowledge and skills (Lave & Wenger, 1991; Wenger, 1998).

Wenger (1998) further explains how identity connects closely with practice and describes five dimensions of identity: (a) identity is the *negotiated experience* of self (how we we define ourselves through participation and how others define us), (b) identity involves *community membership* (how we are defined by the familiar and unfamiliar), (c) identity has a *learning trajectory* (how we define who were are by where we have been and where we are going), (d) identity has a *nexus of multi-membership* (how we bring multiple forms of identity into one), and

(e) identity is a *relation between local and global contexts* or how we define ourselves through experiences and how meaning is attributed to those experiences (p. 149). Otherwise stated, one's identity can be defined in relation to a learning process in the context of communities. When teachers engage and support one another through participation in CoPs, they begin to recognize themselves or gain recognition from others as a certain type of teacher—thus influencing their professional identity (Gee, 2001; Lave & Wenger, 1991; Lave, 1996; Luehmann, 2006; Wenger, 1998).

An identity lens can provide further insight into teachers' professional practices, values, beliefs, and commitments (Luehmann, 2006). According to Beijaard and colleagues (2002), "teachers' perceptions of their own professional identity affect their efficacy and professional development as well as their ability and willingness to cope with educational change and to implement innovations in their own teaching practice" (p. 750). Additionally, Sfard and Prusak (2005) suggest that identities can be viewed as "collections of stories about persons or, more specifically, as those narratives about individuals that are *reifying, endorsable* and *significant*" (p. 11). Through these stories, the construct of identity can be used to "differentiate how teachers participate in and make sense of professional development in practice" (Battey & Franke, 2008, p. 127). Hence, identity will be used as a theoretical lens in this study to better understand how teachers' participation in vendor-sponsored programs shapes the trajectory of their professional lives and teaching practice with regard to technology integration.

The Need for Continuous Professional Development

Battey and Franke (2008) describe how "professional development is a space for acquiring new knowledge, re-crafting identities, and challenging existing cultural and social practices" (p. 128). This continuum of learning is key for improving the quality of teaching in

order to support student learning. Consequently, professional development is often aligned with education reform agendas (Darling-Hammond et al., 2017; Fishman et al., 2003; Porter, Garet, Desimone, Yoon, & Birman, 2000; Yoon et al., 2007). According to Desimone, (2009), "professional development is seen as one of the critical mediators in the effectiveness of policy for teachers and the teaching practice" (p. 181). Nonetheless, there remains a continuous debate about how professional development can best support teachers' learning (Boyle, While, & Boyle, 2004; Darling-Hammond et al., 2017; Desimone, 2009, 2011; Desimone & Garet, 2015).

Traditional Models of Professional Development for Technology Integration

Formal models of professional development that are considered traditional consist of structured courses, workshops, scheduled meetings, or conferences scattered throughout the school year and delivered by outside experts who don't know about the context of the school or of the individual teacher's classroom (Borko, 2004; Boyle et al., 2004; Darling-Hammond, 2009; Desimone & Garet, 2015; Wei et al., 2010; Yoon et al., 2007). These offerings are directly managed by non-teacher stakeholders and take a "top down approach," with little relevance to teachers (Butler, Lauscher, Jarvis-Selinger, & Beckingham, 2004; Darling-Hammond, 2009). As Garet et al. (2001) describe, "traditional forms of professional development are widely criticized as being ineffective in providing teachers with sufficient time, activities, and content necessary for increasing teachers' knowledge and fostering meaningful changes in their classroom practice" (p. 920).

According to Lieberman (2000), "Teachers have been considered as passive receivers of prescriptive programs, given little time or incentive to integrate these new programs into their classroom practice" (p. 226). Often referred to as "one-shot" or "one stop" workshops (Boyle et al., 2004; Butler et al., 2004; Desimone & Garet, 2015; Wei et al., 2009), the "flavor of the

month" (Darling-Hammond, 2009; Wei et al., 2009), and "drive by workshop models" (Darling-Hammond et al., 2017; Stewart, 2012), traditional methods of professional development are considered surface level, episodic, and are regarded as ineffective at promoting change in teachers' practice (Darling-Hammond et al., 2017; Darling-Hammond & Mclaughlin, 1995; Desimone & Garet, 2015; Wei et al., 2010; Yoon et al., 2007). Lieberman (2000) additionally refers to workshops as "one size fits all," since they are not designed according to teachers' professional goals or individual classroom needs (p.221).

Challenges faced with traditional professional development models that "deliver" instead of providing authentic activities situated in the context of the classroom have directly impacted technology integration in schools. Reported issues consistently include lack of time for in depth training and sustained support, both of which are critical since technology changes are fast paced (see Appendix B for a detailed overview on the history of technology integration in schools). Additionally, most professional development for technology tends to focus on the software or hardware itself in a "technocentric" manner (Papert, 1987) with little to no connections made to pedagogy and learning theories, thus making it difficult for teachers to know how to best integrate technologies into their instruction (Butler et al., 2004; Garet et al., 2001; Guskey, 2002; Lawless & Pellegrino, 2007). In order to move forward with the integration of technology, teachers need time and guided support to learn how to incorporate new digital tools innovatively within their instruction (Ertmer, 1999, 2005; Ertmer et al., 2012; Glazer et al., 2009; Hew & Brush, 2007; Hixon & Buckenmeyer, 2009; O'Neal et al., 2017; Tondeur et al., 2016).

A Paradigm Shift in Professional Development

In the "Effective Teacher Professional Development" handbook published by the Learning Policy Institute, Darling-Hammond et al. (2017) acknowledge that, "as demands for deeper and more complex student learning have intensified, practitioners, researchers, and

policymakers have begun to think more systematically about how to improve teachers' learning from recruitment, preparation, and support, to mentoring and other leadership opportunities" (p.1). This paradigm shift began with conceptions of knowledge being situated directly in the teaching practice and considered teachers as learners within the practice (Borko, 2004; Butler et al., 2004; Darling-Hammond & Richardson, 2009; Easton, 2008; Fishman et al., 2014; Lave, 1996; Lieberman, 1995). Coinciding with this shift, the terminology has evolved from *in-service training*, which implied more technical or procedural skills were being imparted—to *professional development* and more recently *professional learning*, thus acknowledging the intellectual activity required in teaching (Butler et al., 2004; Easton, 2008; Feiman-Nemser, 2001; Guskey, 2002; Lieberman, 1995).

Teachers' professional learning would now include the development of pedagogy, content knowledge, instructional technology skills, and a deeper understanding of how students learn (Fishman et al., 2003; Garet et al., 2001; Harris et al., 2009; Lawless & Pellegrino, 2007; Koehler & Mishra, 2005). The paradigm shift additionally acknowledges how teachers are continuously updating their knowledge and changing classroom practices as the latest research findings are disseminated and new technologies emerge (Beach, 2012; Borko, 2004; Butler et al., 2004; Cochran-Smith & Lytle, 1999; Desimone et al., 2002; Duncan-Howell, 2010; Lawless & Pellegrino, 2007). Cochran-Smith and Lytle (1999) reinforce that "teachers learn by challenging their own assumptions; identifying salient issues of practice; posing problems; studying their own students, classrooms, and schools; constructing and reconstructing curriculum; and taking on roles of leadership and activism in efforts to transform classrooms, schools, and societies" (p. 278). Hence, professional development should be seen as an ongoing process with sustained learning opportunities over extended periods of time (Desimone, 2011; Desimone & Garet, 2015;

Desimone et al., 2002; Guskey, 2002; Porter et al., 2000; Wei et al., 2010; Wei et al., 2009; Yoon et al., 2007).

New recommendations for technology integration. In a report presented by the Nellie Mae Education Foundation, researchers advocate that focusing teachers' attention on interactive learning through technology allows them to better meet the needs of 21st century learners (Moeller & Reitzes, 2011). Koehler and Mishra (2005) similarly argue that, "merely introducing technology to the educational process is not enough to ensure technology integration since technology alone does not lead to change. Rather, it is the way in which teachers use technology that has the potential to change education" (p. 132). They discuss building onto Shulman's (1986) theory of "Pedagogical Content Knowledge" (PCK) by adding the domain of technology to form "Technological Pedagogical Content Knowledge" (TPACK) as their framework for understanding the "complex interplay between technology, content, and pedagogy" (p. 132). In this approach, all three elements must be considered in order to build effective lessons that integrate technology while aligning with the subject matter and instructional strategies to best support students' learning needs. As Culp and colleagues (1999) advocate, teachers must learn how to effectively use technology to "help students develop capacities to think creatively and critically, and to learn to use their minds well and deeply in and across the disciplines, inside school and out" (p. 3). This emphasizes the importance of helping teachers to understand the relationships between users, technologies, practices, and tools, especially so they can promote higher order thinking and utilize the affordances of technology while facilitating instruction (Koehler & Mishra, 2005; Tondeur et al., 2017; Unger & Tracey, 2013; Zhao, 2003).

New ways of thinking about teaching and learning with technology such as the TPACK framework (Koehler & Mishra, 2005) have additionally influenced other researchers' focus on

the intersections of design, school culture, and other factors that impact technology integration in education (Culp et al., 1999; Unger & Tracey, 2013). Zhao (2003) explains how teachers need to treat technology as an element in teacher pedagogical knowledge and infuse tools in the classroom based on what supports students instead of focusing on what the technology designers may have originally intended (p. 8). He also advocates that, "teachers need to be portrayed as designers and empowered to integrate technology within curriculum to promote learning instead of being constrained by the mechanical functions of technology" (p. 10). Many researchers like Zhao argue that empowering teachers is key because it builds their confidence and self-efficacy with regard to using technology. Moreover, several studies have shown a direct correlation between teachers' beliefs, dispositions, attitudes, or prior experience and how technology is integrated in their classrooms (Ertmer, 2005; Ertmer et al., 1999; Ertmer & Ottenbreit-Leftwich, 2010, 2013; Kim et al., 2013; Kopcha, 2012; O'Neal et al., 2017; Tondeur et al., 2017; Vannatta & Fordham, 2004).

Numerous researchers have additionally suggested that teachers advance through levels or stages of development in their technology integration (Baker et al., 1985; Bradshaw, 2002; CEO Forum on Education and Technology, 1999; Dwyer, 1994, 1995; Holland, 2001; Moersch, 1995; Rieber & Welliver, 1989; Ringstaff & Kelley, 2002; Ringstaff, Yocam, & Marsh, 1996). Many of these frameworks are based on teachers' concerns about innovations, and are often called "concerns-based models-CBAM" (Bradshaw, 2002). For example, Rieber and Welliver (1989), proposed a five-stage developmental sequence where teachers move from: (a) familiarization, (b) utilization, (c) integration, (d) reorientation, and (e) evolution as they progress in their comfort with technology. Likewise, the *Apple Classrooms of Tomorrow* (ACOT) research project (1985-1995) outlined five phases of teacher technology adoption,

describing the process of integrating technology to transform the instruction in the learning environment as: (a) *Entry*- educators struggle with technology, (b) *Adoption*- basic level (e.g. drill and practice software for classroom instruction), (c) *Adaption*- "discovery of its potential for increased productivity" (e.g. use of word processors for student writing), (d) *Appropriation*- educators use technology "effortlessly" as a teaching tool, and (e) *Invention*- highest level where educators "develop entirely new learning environments that utilize technology as a flexible tool through collaborative, interactive, and customized learning" (Baker et al., 1985; Dwyer, 1994, 1995; Dwyer et al., 1990a, 1990b; Ringstaff & Kelley, 2002; Ringstaff et al., 1996). These phases have been included in a School Technology and Readiness Chart (STaR Chart), which is a self-assessment tool that was designed by the CEO Forum on Education and Technology (1999) to "help K-12 schools chart their readiness to use and integrate technology in teaching and learning" (p. 19).

Building on other studies about teachers moving through stages with technology, Moersch (1995) developed the Levels of Technology Implementation (LoTi) Instrument as a "framework for measuring classroom technology use to assist school districts in restructuring their staff's curricula to include concept/process-based instruction, authentic uses of technology, and qualitative assessment" (p. 41). It identifies seven levels that teachers can progress through: (a) non-use, (b) awareness, (c) exploration, (d) infusion, (e) integration, (f) expansion, and (g) refinement. Each level describes examples of how technology is used to support learning, with an emphasis on moving from teacher-centered to student-centered approaches. Higher levels involve the replacement of traditional instructional pedagogies with authentic hands-on inquiry related to a problem, issue, or theme (Harris, 2005; Hixon & Buckenmeyer, 2009; Moersch, 1995). It has more recently been titled, "Levels of Teaching Innovation" and now includes

"digital age literacy teaching practices (e.g., learning-centered instruction, real-world problem-solving, collaborative learning environments)," which is endorsed by the ISTE organization and used in many studies to evaluate classroom technology integration (LoTi, 2016; Moersch, 2011).

In a case study of teachers' professional development with instructional technology, Holland (2001) similarly classifies teachers' developmental levels of knowledge and skill in applying technology in the classroom along a continuum of (a) non-readiness, (b) survival, (c) mastery, (d) impact, and (e) innovation (p. 245). She discusses how teachers' personal use of technology has a direct impact on their integration of technology within instruction. Since there is a spectrum of where teachers fall according to these developmental levels, she recommends "peer coaching" (Showers, 1984; Showers & Joyce, 1996) or "technical coaching" (Garmston, 1987) to help all teachers continue to develop their knowledge and use of technology so they are able to progress from wherever they are. Holland also emphasizes the importance of leadership that includes "the empowerment of teachers, the development of a collaborative vision, and the management of a technology plan" to promote technology integration as part of the school culture (p. 263).

Correspondingly, Hew and Brush (2007) advocate that a shared vision and technology integration plan can "serve as a driving force for overcoming leadership barriers to technology use" (p. 232). They discuss how the vision for technology integration needs to focus on student learning and all stakeholders should be involved in the decision-making process, especially teachers. This is essential because teachers know their needs and can make recommendations to best meet them with regard to training. Additionally, Hew and Brush (2007) believe that professional development can directly influence teachers' technology integration when it: (a) focuses on content (e.g., technology knowledge and skills, technology-supported pedagogy

knowledge and skills, and technology-related classroom management knowledge and skills), (b) gives teachers opportunities for hands on work, and (c) is highly consistent with teachers' needs (p. 238).

As Ertmer (1999) additionally argues, "teachers with a limited amount of training may begin using technology with current levels of knowledge and skill or wait until sufficient levels have been obtained, depending on how significantly they weigh their own lack of training" (p. 52). Moreover, she discusses how "teachers with limited knowledge may initially provide restricted student use until they have mastered skills themselves, or possibly they will enlist students as classroom technology experts to share their expertise with others" (p. 52). For these reasons, Ertmer (1999) believes "teachers need opportunities to observe models of integrated technology use, to reflect on and discuss their evolving ideas with mentors and peers, and to collaborate with others on meaningful projects as they try out their new ideas about teaching and learning with technology" (p. 52). In other words, professional development for technology integration should encompass social and situated learning opportunities that extend beyond an isolated workshop so teachers can learn how to successfully integrate technology with other elements of their classroom practice (Bradshaw, 2002; Ertmer, 1999, 2005; Ertmer & Ottenbreit-Leftwich, 2010, 2013; Freeman et al., 2017; Glazer et al., 2009; Polly & Hannafin, 2010; Kopcha, 2012; Tondeur et al., 2016).

The International Society for Technology in Education (ISTE) suggests that effective professional development formats are "technology-rich, delivered through a coaching model, and are enhanced by the power of community and social learning" (Beglau et al., 2011, p. 2). In alignment with these suggestions, several studies similarly discuss the benefits of collaboration, mentoring, coaching, and apprenticeships to support professional learning with technology

integration (Barron et al., 2009; Bradshaw, 2002; Beglau et al., 2011; Browne & Ritchie, 1991; Glazer et al., 2009; Holmes et al., 2002; MacArthur, Pilato, Kercher, Peterson, Malouf, & Jamison, 1995; Sugar, 2005). While some schools and districts have begun to incorporate these elements, there are still inconsistencies with regard to how professional development is implemented and what it offers (Bradshaw, 2002; Ertmer, 2005; Hew & Brush, 2007; Holmes et al., 2002; Mouza, 2002; Polly & Hannafin, 2010; Tondeur et al., 2016; Twining et al., 2013). As a result, many teachers have turned to online spaces and their professional networks for further guidance with technology in education. They are accessing websites, blogs, wikis, discussion forums, videos, podcasts, and other free resources designed by and for teachers, in addition to participating in webinars, virtual lectures, Massive Open Online Courses (MOOCs), micro-credential programs, and unconferences such as *Edcamps* or other informal collaborative opportunities that may not be offered in schools. Moreover, teachers are participating and earning digital badges in professional development programs sponsored by vendors to increase their proficiency with classroom technology integration (Carpenter et al., 2016; CTQ & Digital Promise, 2016, 2017; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; Singer, 2017; Trust, 2012, 2016; U.S. Department of Education, 2016).

Contemporary models of professional learning. Butler and colleagues (2004) discuss how, "individuals do not construct knowledge in a vacuum, their construction of knowledge, beliefs, attitudes, and skills are socially and culturally situated" (p. 438). This reinforces that teachers need professional development to be situated in practice so they can connect learning to the contexts of their teaching. Additionally, since knowledge is co-constructed socially through collaboration and collective participation, teachers need opportunities for collegial interaction. Teachers are invaluable resources to one another as learners, especially when they share

expertise and helpful strategies about the practice in meaningful ways that deepen their learning (Butler et al., 2004; Darling-Hammond et al., 2017; Desimone & Garet, 2015; DuFour, 2011; Hord, 2015; Lieberman & Miller, 2016; Mclaughlin & Talbert, 2006; Vescio, Ross, & Adams, 2008). As Lieberman (2000) states, "keeping a balance between inside knowledge (the experiential knowledge of teachers) and outside knowledge (knowledge created by research and conceptualization) is a hallmark of successful collaboratives" (p. 223).

With empirical evidence supporting the benefits of collaborative learning, contemporary models of professional development that promote knowledge sharing among teachers include:

- **Informal Learning** (Coombs, 1985; Eraut, 2000; Livingstone, 2001; Marsick & Watkins, 1990, 2001; Schugurensky, 2000)
- **Peer-to-Peer Learning** (Green & Hannon, 2007; Schollmeier, 2001; Shulman, 1986; Trust, 2016; Wang, Yang, & Chou; 2008)
- **Mentoring** (Cochran-Smith & Lytle, 1999; Darling-Hammond, 2009, 2010; Feiman-Nemser, 1996, 2001; Little, 1990a; MacArthur, Pilato, Kercher, Peterson, Malouf, & Jamison, 1995)
- **Coaching** (Cornett & Knight, 2009; Costa & Garmston, 1994; Garmston, 1987; Joyce & Showers, 1981, 1982; Knight, 2007, 2009; Showers, 1984; Showers & Joyce, 1996)
- **Apprenticeships** (Browne & Ritchie, 1991; Collins, Brown, & Newman, 1989; Glazer & Hannafin, 2006, 2008; Glazer, Hannafin, & Song, 2005; Glazer, Hannafin, Polly, & Rich, 2009)
- **Communities of Practice- CoPs** (Lave & Wenger, 1991; Wenger, 1998, 2000; Wenger & Trayner-Wenger, 2015)

- **Professional Learning Communities- PLCs** (DuFour, 2004, 2011; DuFour & Eaker, 1998; Hord, 1997; Hord & Cowan, 1999)
- **Professional Learning Networks-PLNs** (Flanigan, 2011; Ivanova, 2009; Lieberman, 1995, 2000; Trust, 2012, 2016; Trust, Krutka, & Carpenter, 2016)

Echoing the sentiments of the late Seymour Sarason (1990), former Professor Emeritus at Yale University, Grossman and colleagues (2001) discuss how, "we cannot expect teachers to create a vigorous community of learners among students if they have no parallel community to nourish themselves" (p. 70). Therefore, teachers need opportunities to learn how students learn so they can best integrate theory with classroom practice (Darling-Hammond & Mclaughlin, 1995; Lieberman, 1995).

Many researchers have suggested similar key elements that are believed to be important for effective professional development, which include: opportunities for joint inquiry, collaborative problem solving, critical reflecting, and active learning. For example, Desimone and Garet (2015) identify five key features of professional development for improving teaching practice: (a) focus on content and how students learn content, (b) active learning opportunities, (c) coherence between content, goals, and activities with teachers' knowledge and beliefs in addition to the needs of students, (d) sustained duration, and (e) the collective participation of groups of teachers from the same school, grade, or department (p. 253). Similarly, Darling-Hammond and colleagues (2017) argue that effective professional development must: (a) be content focused, (b) incorporate active learning, (c) support collaboration, (d) use models of effective practice, (e) provide coaching and expert support, (f) offer feedback and reflection, and (g) continue over a sustained duration (p. v-vi). Furthermore, contemporary models of professional development are personalized to meet the individual goals and needs of teachers

through authentic, relevant, and applicable activities that can include ongoing coaching (Darling-Hammond et al., 2017; Desimone, 2009, 2011; Desimone & Garet, 2015; DuFour, 2011; Hord, 2015; Mclaughlin & Talbert, 2006; Wei et al., 2010).

Informal learning. *Nonformal* education or informal learning is viewed as "the most prevalent form of adult learning" (Merriam, Baumgartner, & Caffarella, 2007). Coombs (1985) originally defined this phenomenon as "the spontaneous, unstructured learning that goes on daily in the home and neighborhood, behind the school and on the playing field, in the workplace, marketplace, library, and museum, and through the various mass media" (p. 92). Meanwhile, Marsick and Watkins (1990) describe informal learning as "a category that includes incidental learning, may occur in institutions, but it is not typically classroom-based or highly structured, and control of learning rests primarily in the hands of the learner" (p. 12). They also draw connections with *self-directed learning* (Candy, 1991; Knowles, 1950), *reflection-in-action* (Schön, 1983), *situated cognition* (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991), and *legitimate peripheral participation* in *communities of practice* (Wenger, 1998; Wenger & Trayner-Wenger, 2015), because they believe tacit knowledge may be gained independently or as a result of interpersonal interactions (Marsick & Watkins, 1990, 2001). Similarly, Schugurensky (2000) categorizes "three forms of informal learning: self-directed learning, incidental or tacit learning, and socialization, which can occur individually or in groups." He justifies this by explaining how a variety of sources may be used for learning such as books, newspapers, TV, the Internet, museums, schools, universities, friends, relatives, experiences, etc. (p. 6). Moreover, Livingstone (2001) defines informal learning as "any activity involving the pursuit of understanding, knowledge, or skill which occurs without the presence of externally imposed curricular criteria" (p. 5).

Informal learning is commonly referred to as “everyday learning” because it takes place in flexible contexts without imposed curriculum or systematic support (Hoekstra et al., 2007; Illeris, 2004; Livingstone, 2001; Merriam et al., 2007). Simply put, informal learning can occur anywhere when a person is motivated and has the need or opportunity to learn (Marsick & Watkins, 1990, 2001). Russo, Watkins, & Groundwater-Smith (2009) further describe it as "learner-centered, or learner-directed, where the learner has agency over what is being learned, how it is being understood and evaluated, and how it will be used" (p. 158). As previously mentioned, when informal learning is intentional and conscious, it is often closely affiliated with Malcolm Knowles’ (1975) theory of *self-directed learning*, which stresses that adults are in pursuit of their own knowledge and they take initiative without the help of others. This includes diagnosing their learning needs, setting goals, seeking resources, selecting strategies for learning, and evaluating learning outcomes (p. 18). Cafarella (1993) uses three principles to further describe self-directed learning as: a self-initiated process of learning, a sense of personal autonomy, and greater learner control (p. 26). From this perspective, institutions do not control learning and instead adults are empowered take responsibility of their own learning. Hence, highly motivated and self-directed learners may seek informal opportunities to build knowledge independently or in collaboration with others (Candy, 1991; Knowles, 1975; Livingstone, 2001; Kwakman, 2003; Song & Bonk, 2016; van Eekelen, Boshuizen, & Vermunt, 2005; Zhao & Kemp, 2012).

After conducting a later study, Marsick and Watkins (2001) summarize that learning happens across multiple interfaces including individual, team (mutual construction of new knowledge), and organizational levels (embedded in systems, policies, procedures, or work processes), which are highly influenced by social and cultural norms (p. 31-32). Butler and

colleagues (2004) describe this as a “dynamic interplay between social and individual learning processes” (p. 436). Jurasite-Harbison and Rex (2013) additionally advocate that “decisions about whether to learn spontaneously or deliberately, independently or collegially may be impacted by a learners' emotional and cognitive state” (p. 17). Furthermore, Eraut (2000) asserts that understanding the process of socialization and norms through observation, induction, and increased participation in professional workplaces is key for learning (p.122). This reinforces situated and social theories of learning, where the workplace is recognized as an authentic context for growth and development, which is additionally influenced by cultural norms (Barab & Duffy, 2000; Bransford et al., 2000; Brown et al., 1989; Eraut, 1995, 2000; 2004, 2011; Greeno & Moore, 1993; Lave & Wenger, 1991; Putnam & Borko, 2000).

Accordingly, there is an increasing interest in schools as contexts for teachers' informal learning outside of traditional professional development models (CTQ & Digital Promise, 2016, 2017; Hoekstra et al., 2007; Jones & Dexter, 2014; Jurasaite-Harbison & Rex, 2010, 2013; Williams, 2003). As previously discussed, traditional models of professional development that include workshops and conferences are considered formal because they are highly structured, prescriptive, and often led by outside experts who are following a set agenda. While formal professional development may provide opportunities for learning, teachers also report that they learn directly in the workplace through the act of teaching, interaction with colleagues, and when reflecting upon their practice (Desimone, 2009; Hoekstra, 2007; Jurasite-Harbison & Rex, 2010, 2013; Kwakman, 2003; Lieberman, 1995; Lieberman & Miller, 2008, 2011, 2016; Schön, 1983).

This has resulted in the endorsement of *professional learning communities*—PLCs (DuFour, 2004; Hord, 2009, 2015), a reform to traditional professional development, which provides teachers with sustained opportunities to meet for discussions on student learning and

strategies for school improvement. In related efforts, teachers have also established *communities of practice*—CoPs (Lave & Wenger, 1991; Wenger, 1998; Wenger & Trayner-Wenger, 2015), *networks of practice*—NoPs (Brown & Duguid, 2000), and *professional learning networks*—PLNs (Flanigan, 2011; Ivanova, 2009; Lieberman, 1995, 2000; Trust, 2012, 2016; Trust et al., 2016) to share information, connect with other teachers, obtain feedback or help, and to find resources that are tailored to their needs and interests. These networks and communities allow teachers to interact on both formal and informal levels as they collaborate with one another. According to Lieberman and Miller (2011), "learning communities privilege theory as well as practice; they encourage and support members to examine their practice, to try out new ideas, to reflect together on what works and why; and they provide opportunities for the collective construction and sharing of new knowledge (p. 16). Furthermore, new technologies allow teachers to connect across different schools globally, providing a much larger pool of expertise than what may be available to them locally (Beach, 2017; Booth, 2012; Carpenter et al., 2016; Riel & Polin, 2004; Schlager, Farooq, Fusco, Schank,& Dwyer, 2009; Trust, 2012, 2016; Warlick, 2009).

As Desimone (2009) points out, "teachers experience a vast range of activities and interactions that may increase their knowledge and skills and improve their teaching practice, as well as contribute to their personal, social, and emotional growth as teachers" (p. 182). Little (1990a) argues that the content of collegial interaction including joint work, storytelling, helping, and sharing are the most important aspects of informal collaboration impacting teachers' learning (p. 513-523). In her later studies, Little (2002) concentrates on teachers' knowledge gained from questioning ineffective teaching routines, examining new conceptions of teaching and learning, addressing conflict, and mutually supporting professional growth among other teachers (p. 913-

914). She discusses how most research is focused on the formal interactions of teacher professional development and she emphasizes the need to explore the informal dynamics that promote teacher learning through professional communities (p. 917).

Jurasaite-Harbison and Rex (2013) also explore what prompts teachers to learn informally and how teachers construct their professional learning (p. 5). In one of their studies, teachers were classified as *proactive* or *reactive* learners based on whether they intentionally set specific learning goals to accomplish or if they casually responded to problems or informal learning opportunities as they arose. These researchers additionally discuss how this can help others to better understand motivating factors for informal learning, especially since they found the majority of teachers in their studies to be social and interactive when pursuing resources and learning to improve their professional practice.

According to Hew and Hara (2007), "continuous professional development may be seen as a multifaceted enterprise that encompasses both formal and informal knowledge sharing approaches that can result in positive changes in an individual's knowledge, skills, attitudes, and behavior" (p. 573-574). Additionally, informal learning may help to fill gaps of knowledge that are not covered in formal professional development (Puteh, Kaliannan, & Alam, 2015). In fact, with more emphasis being placed on informal and self-directed or participant-driven methods of learning, "unconferences" such as *TeachMeets* and *EdCamps* have risen in popularity. Carpenter and Linton (2016) discuss how unconferences utilize the principles of "Open Space Technology" (Owen, 2008), a meeting structure where participants "self-organize, collaborate, and solve complex problems" (p. 97). Drastically different from formal learning methods found in traditional professional development, unconferences empower teachers to organically set agendas that are aligned with their specific needs, thus giving them an active role in their

learning (Barnett, 2014; Carpenter, 2016; Carpenter & Linton, 2016; Ferriter & Provenzano, 2013; Kalesse, 2014; Swanson, 2014). Swanson (2014), who is one of the original founders of the *EdCamp* unconference model, advocates, "we must trust that teachers are professionals who use their classrooms as innovative laboratories and who are motivated to engage in authentic learning" (p. 39). Similarly, Barnett (2014) describes how unconferences can illuminate new learning techniques including those with technology integration since they are aligned with teachers' interests, collaborative and ongoing, and interactive (p. 24).

Carpenter and Linton (2016) surveyed 792 teachers, examining their motivations for attending *Edcamps* and perceptions of *Edcamp* experiences. Findings revealed that "93% of participants were motivated by the opportunity to work with other educators and engage in conversation," and many commented how they appreciate connecting with like-minded educators to grow professionally while learning strategies for teaching, learning, technology, and leadership (p. 101-102). Teachers also noted that *Edcamps* offer more engaging and relevant topics than traditional professional development, where they can be in control of their own learning.

Informal learning including participation in unconferences continues to be impacted by new technologies. Song and Bonk (2016) state, "as technologies transform access to and delivery of learning resources, they have significantly altered an individual's learning and academic paths" (p. 3). Consequently, technology provides a mechanism for on demand or just-in-time learning, while empowering learners. This plethora of online tools and resources offer teachers choices on the time, location, contents, and pathway for learning with opportunities to collaborate across geographic boundaries (Beach, 2017; Carpenter et al., 2016; Corcoran & Quattrocchi, 2014; Hew & Hara, 2007; Hur & Brush, 2009; Jones & Dexter, 2014; Little &

Housand, 2011). For instance, most unconferences were initially conducted in person and coincided with educational conferences or learning festivals, but more recently they have expanded to virtual spaces, utilizing video conferencing tools and social media platforms (Carpenter, 2016; Carpenter & Linton, 2016; Ferriter & Provenzano, 2013; Swanson, 2014).

In a survey of 20,000 teachers conducted by Scholastic with support from the Bill and Melinda Gates Foundation (2014), 90% of respondents reported that they use mainstream social networking sites for professional purposes; 65% mentioned using websites for advice and support; and at least 57% said they use technologies to collaborate with other educators whom they otherwise wouldn't have access to (p. 92). Additionally, Grunwald Associates LLC and Digital Promise (2015) surveyed 856 teachers and found that 72% participate in informal learning opportunities via "expert practice videos, professional learning communities, online educator networks, and Twitter" (p. 16). When asked about their motivation for this, teachers responded that they feel "strongly encouraged to participate in informal activities because they enjoy learning, like to keep up to date and network with other educators, and because informal activities are tailored to their specific interests, among other factors" (p. 16). Likewise, after surveying four hundred educators and conducting follow up interviews with fifty of the participants, *edSurge* published an in-depth report, "How Teachers are Learning: Professional Development Remix" with a framework for professional development centered on technology tools. Findings confirm that, "teachers get the most value out of informal learning opportunities such as *Edcamps* and Twitter chats" and the report concludes that informal learning should be leveraged within professional development with recognition given via badges, certificates, continued education units (CEUs), or other incentives (Corcoran & Quattrocchi, 2014, p. 9). This aligns with additional researchers' recommendations to give teachers choice for what and how

they want to learn (Beijaard, Korthagen, & Verloop, 2007; Burbank & Kauchak, 2003; CTQ & Digital Promise, 2016, 2017; Little, 1990b; Polly & Hannafin, 2010; Porter, Garet, Desimone, Yoon, & Birman, 2000; Vescio et al., 2008).

Porter et al. (2000) acknowledge that when teachers have the discretion to choose their own professional development activities aligned with their individual goals and needs, this increases their overall investment (p. 15). Ultimately, the focus should be on teachers as learners with opportunities to develop instructional strategies and expertise in the practice as they deem necessary and beneficial to their own improvement. By fostering self-directed and informal learning through professional development, this can increase teachers' motivation along with improving their application of technology, pedagogy, and content knowledge in the classroom (Avalos, 2011; Beach, 2017; Borko, 2004; CTQ & Digital Promise, 2016, 2017; Ferriter & Provenzano, 2013; Jones & Dexter, 2014; Tondeur, 2017).

Peer-to-peer learning. Social interactions and the school environment play an active role in teachers' development, especially through peer-to-peer (P2P) learning opportunities (Bransford et al., 2000; Fishman et al., 2014; Lave, 1996; Mclaughlin & Talbert, 2006; Robson, 2016; Schmidt et al., 2009). The term "peer-to-peer" has been used to define file-sharing networks, where people distribute knowledge online in a multidirectional process (Schollmeier, 2001). Translating this analogy of computer networks to people, Schmidt and colleagues (2009), describe peer-to-peer learning as "a network of equals (peers) in which two or more individuals are able to spontaneously collaborate without necessarily needing central coordination" (p. 4). They draw further connections with the Open Education movement and self-organized learning communities that continue to emerge online.

Similarly, Wang and colleagues (2008) discuss how peer-to-peer technology supports

knowledge sharing flexibly across communities of practice (p. 1421). They describe a "knowledge-sharing architecture," where communities may include: *colleague peers, companion peers, knowledge peers*, and *information peers* (p. 1423-1424). They believe this system is how community members voluntarily share and retrieve knowledge effectively with different types of peers. Trust (2016) describes "*peer-to-peer professional development networks* as teachers sharing professional knowledge directly with one another rather than having to seek out knowledge from a central entity that may include a school leader, outside expert, or district specialist" (p. 293). In other words, teachers can learn from each other, instead of needing to rely on traditional professional development models that frequently use a "top down" approach. Peer-to-peer learning is also sometimes connected with peer-coaching and collaborative apprenticeships (Barron et al., 2009; Glazer & Hannafin, 2006, 2008; Glazer et al., 2005), which will be discussed further in the next section.

Mentoring, coaching, and apprenticeships. Teacher learning is mediated through conversations and collaborative opportunities, which can include coaching, mentoring, participation in apprenticeships, book/lesson studies, or action research within schools, districts, and across online spaces (Darling-Hammond et al., 2017; Desimone & Garet, 2015; Desimone & Pak, 2017; Easton, 2008; Robson, 2016; Trust, 2015, 2016). As teachers become more experienced, they move from *legitimate peripheral participants* to central participants (Lave, 1996; Lave & Wenger, 1991; Wenger, 1998), frequently taking on leadership roles as mentors or coaches when sharing their professional expertise in collaboration with others.

Mentor teachers (also referred to as master teachers) are *more knowledgeable others* who scaffold learning for less experienced teachers by meeting them at their *zone of proximal development* as they are gaining a better understanding of the practice (Feiman-Nemser, 1996,

2001; Fishman et al., 2014; Little, 1990a; Vygotsky, 1978). Mentor teachers are often selected based on their years of experience or content knowledge expertise (which may include technology integration skills) to lead committees, to guide other in-service teachers, to work with brand new teachers through the induction process, or to host student teachers through clinical experiences. Following apprenticeship models, mentor teachers provide support to help newcomers participate alongside them while modeling and offering feedback as needed. Mentoring can be a powerful form of professional development for both veteran and novice teachers, who are often learning together (Cochran-Smith & Lytle, 1999; Darling-Hammond et al., 2017; Desimone & Pak, 2017; Feiman-Nemser, 1996, 2001; Little, 1990a; Wei et al., 2010). According to Feiman-Nemser (2001), mentor teachers are constantly refining their skills when observing, analyzing, coaching, assessing, and collaborating with fellow teachers (p. 1037). In addition to gaining valuable skills, mentor teachers provide social support and personalized feedback through their coaching (Fishman et al., 2014). For these reasons, mentoring has also been identified as effective for technology integration. Mentor teachers can model best practices, guide other teachers in designing and implementing their own technology-enhanced lessons, and provide scaffolded support as mentees become more confident in the use of technologies (Holmes et al., 2002; MacArthur et al., 1995). Furthermore, new technologies have enabled teachers to mentor and receive support online via video observations or "telementoring," since teachers can choose when to connect without being constrained by barriers of time and distance, which is especially helpful if they do not have these opportunities within their school or district (Culp et al., 1999; Lee & Wu, 2006; Schlager et al., 2009; U.S. Department of Education, 2016).

Aligned with mentoring practices, apprenticeships have similarly been discussed as a form of professional learning between expert and novice teachers. A "cognitive apprenticeship"

emphasizes learning through guided experience with experts while focusing on cognitive and metacognitive processes (Brown et al., 1980; Browne & Ritchie, 1991; Collins, Brown, & Newman, 1986). According to Collins and colleagues (1986), "it differs from traditional apprenticeship in that the tasks and problems are chosen to illustrate the power of certain techniques or methods" and they are "sequenced to reflect the changing demands of learning" (p. 6). Cognitive apprenticeship strategies include modeling, coaching, and fading, with ongoing opportunities for reflection.

Browne and Ritchie (1991) discuss linking cognitive apprenticeship models with professional development for technology integration in schools. Their framework emphasizes instruction, modeling, coaching, and empowerment to: (a) conditionalize knowledge so that teachers understand the uses or purposes of the knowledge they are learning, (b) provide a conceptual framework for interpreting knowledge and skills, (c) develop fluency for gaining automaticity and expertise, and (d) develop self-monitoring and correction skills used in successive approximation (p. 33). They provide detailed examples of how this framework worked when implemented in schools with teachers who were able to successfully integrate technology as a result (p. 31-32). Findings also confirmed the benefits of using a problem-solving approach for learning in authentic learning contexts and providing ample opportunities for teachers to share, demonstrate, and collaborate further on effective technology integration strategies.

Drawing from Collins et al.'s (1989) cognitive apprenticeship model and from collaborative concepts (i.e. "mutual engagement, shared repertoire, and joint enterprise") found in communities of practice (Wenger, 1998), Glazer and colleagues (2005) developed the "collaborative apprenticeship" model for technology integration in K-12 settings. Collaborative

apprenticeships feature "reciprocal interactions between peer-teachers and teacher-leaders moving through four progressive phases with technology: (a) introduction, (b) developmental, (c) proficient, and (d) mastery" (Glazer & Hannafin, 2006, 2008; Glazer et al., 2005; Glazer et al., 2009). Rather than novice teachers learning solely from observing expert teachers, they work together at "designing, developing, and implementing learning activities using new instructional strategies or resources" (p. 60). According to Glazer, Hannafin, and Song (2005), "as peer-teachers become more proficient in technology-integration skills, and thus more autonomous in technology-integration practice, the interactions decrease gradually, eventually fading completely. As a result, more peer-teachers become teacher-leaders, building the collective repertoire of the community" (p. 59-60). Glazer and colleagues tested this framework in various schools settings (i.e. Glazer & Hannafin, 2008; Glazer et al., 2009), finding that teachers appreciated being able to collaborate and mutually support one another, which in turn helped to increase their comfort levels with technology. They additionally noted that "curriculum, connection to an individual, expertise, and physical proximity all influenced interactions" (Glazer et al., 2009, p. 29). Based on these findings, they believe that "in contrast to traditional professional development approaches, the collaborative apprenticeship supports teachers learning within communities of practice that are on-site, ongoing, and just in time" (Glazer et al., 2009, p. 36).

While some teachers take on additional leadership roles as mentors and participate in apprenticeships to guide novices entering the profession, others contribute as coaches, providing sustained support with ongoing teacher learning and the implementation of new initiatives. Coaching (also considered an aspect or type of mentoring) may occur informally among colleagues as they provide peer-to-peer feedback to one another or more formally when teachers

with specific content expertise are designated as academic coaches to guide other teachers throughout their professional development. In fact, there are school districts that intentionally hire teachers on special assignment (TOSAs), who work as coaches with the formal purpose of observing other teachers and providing feedback in an ongoing cycle of instruction (Cornett & Knight, 2009; Desimone & Pak, 2017; Ippolito, 2010; Joyce & Showers, 1981, 1982; Knight, 2007, 2009; Little, 1990a; Russo, 2004; Showers, 1984). According to Kraft and colleagues (2016), these types of coaches are "thought to be experts in their field who model research-based practices and work with teachers to incorporate these practices into their own classrooms" (p. 6).

The International Society for Technology in Education (ISTE) consistently advocates that coaching is "a powerful means of both modeling and harnessing the potential of technology to improve teaching and learning" (Beglau et al., 2011, p. 3). They discuss how coaching provides "a multi-tiered support structure for technology integration," as coaches guide teachers based on their specific needs. Additionally, they believe that these collaborative opportunities help to strengthen coaches' lesson design skills with technology integration. *ISTE* recommends that coaching practices include three essential components: (a) context, (b) relevance, and (c) ongoing opportunities for learning (Beglau et al., 2011, p. 7). For further support with leveraging technology through coaching, they have also developed the NETS*C- National Educational Standards for Coaches (ISTE, 2011).

In a study where teachers across five schools were paired with a technology coach as part of a professional development program, Sugar (2005) found that teachers gained confidence with integrating technology in their instruction. Teacher participants reported that they valued the hands-on training and the "opportunity to focus on their own individual technology needs" (p. 555). They also mentioned appreciating how the technology coach was able to align training

with their students' needs as well because it was situated in their classrooms. Meanwhile, Lowther and colleagues (2008) conducted a similar study with full-time, on-site technology coaches in 26 schools over the span of three years. Based on survey responses and observations, they also found that technology coaches significantly increase teachers' confidence in integrating new technologies, as well as enhancing their technology skills. Moreover, Sugar and Tyron (2014) have explored the possibility of implementing "virtual technology coaches" as an option for schools without on-site coaches to support technology integration efforts (p. 54). In a survey with sixty in-service teachers, findings reiterated the importance of collaboration, discussion, learning, and sharing. Teachers particularly liked the idea of building a virtual technology coach-facilitated learning community where they could compile resources and remain connected (p. 60).

In addition to receiving feedback from designated academic or instructional coaches, peer coaching may informally occur when teachers help one another to improve their practice (Kraft et al., 2016; Kurz, Reddy, & Glover, 2017; Showers, 1984; Showers & Joyce, 1996; Wei et al., 2010). Kurz and colleagues (2017) discuss key elements of the peer-coaching process as: (a) collective ownership of the change process, (b) mutual support and development of goals, plans, and materials, (c) an exchange of roles between coaches and coaches, and (d) the provision of opportunities to learn during collaboration with peers" (p. 67). Likewise, Hord (2005) describes this as a "peers helping peers" process, where teachers "act as change facilitators for each other, supporting the adoption of new practices through peer coaching and feedback" (p. 11).

Furthermore, many researchers argue that peer coaching is critical when teachers are learning to integrate new technologies within their classrooms because of the sustained support and feedback that is provided (Barron et al., 2009; Beglau et al., 2011; Bradshaw, 2002; Browne

& Ritchie, 1991; Freeman et al., 2017; Garmston, 1987; Glazer & Hannafin, 2006, 2008; Holland, 2001; Kopcha, 2012). In fact, Microsoft has implemented the *Microsoft Peer Coaching*-(MPC) program in collaboration with the Puget Sound Center for Teaching, Learning, and Technology (PSCTLT), utilizing a mentoring format that focuses on the effective technology integration in schools (Barron et al., 2009; Beglau et al., 2011; Ishizuka, 2004; Microsoft Peer Coaching Program, 2015). As stated on the Microsoft website:

> The Peer Coaching Program is designed to help schools implement a professional development model that can enhance standards-based instruction by assisting teachers to offer students engaging, technology rich, learning activities. The Peer Coaching Program is designed to train teacher leaders to serve as peer coaches for colleagues. As coaches, these teachers will assist their peers in identifying ways to enhance standards-based instruction and to offer their students engaging, technology-rich, learning activities. In doing so, peer coaches will help their colleagues to develop the necessary technology skills and instructional strategies needed to integrate technology into teaching and learning." (Microsoft Peer Coaching Program, 2015, para 1).

According to Barron and colleagues (2009), who conducted an evaluation of the MPC program, it promotes collaboration, although it tends to focus more on the aspects of peer coaching than on actual technology integration. They conclude that it would be strengthened by introducing coaches to models of teachers' technology adoption (e.g. Dwyer et al., 1990a, Moersch, 1995) and helping teachers to reflect on their movement through each level. Moreover, they discuss the importance of coaches and teachers considering the varying roles that students can play in technology integration as consumers, producers, and collaborators (p. 93-94).

Communities of practice. A *community of practice* (CoP) is a "social learning system grounded in sociocultural theories of learning and development" (Wenger, 2000; Wenger & Trayner-Wenger, 2015). According to Lave and Wenger (1991), "learning is an integral and inseparable aspect of social practice" (p. 319). In other words, learning is situated within the

context of a domain or practice and occurs through authentic experiences among participants with varying levels of expertise, referred to as newcomers and old-timers (Lave & Wenger, 1991; Vygotsky, 1978; Wenger, 1998; Wenger & Trayner-Wenger, 2015). The circulation of knowledge among "old-timers and other members of the community" allows newcomers to become more than just observers and instead they are directly absorbed within the culture of practice, transforming them into practitioners with a sense of belonging (Lave & Wenger, 1991; Wenger 1998; Wenger & Trayner-Wenger, 2015).

Through engagement, collaboration, and legitimate peripheral participation, identities are formed within the community, providing an understanding of the practice in relation to shared goals (Lave & Wenger, 1991; Wenger, 1998, 2000; Wenger & Trayner-Wenger, 2015). According to Wenger (1998), identity is developed through the "mutuality of participation" (p. 56). He further explains:

> Building an identity consists of negotiating the meanings of our experience of membership in social communities. The concept of identity serves as a pivot between the social and the individual, so that each can be talked about in terms of the other. (p. 145)

Wenger (1998) also advocates that identity "is more than just a single trajectory" and should be viewed as a "nexus of multi-membership," since participants may be active in more than one community of practice (p. 159).

As supported by literature, implementing a community of practice model with teachers provides known benefits including increased professional reflection, self-efficacy, and confidence in the classroom, in addition to the development of collegial relationships with other educators (Battey & Franke, 2008; Jimenez-Silva & Olson, 2012; Lave, 1996; Lieberman & Miller, 2008, 2011, 2016; Riel & Polin, 2004; Schlager & Fusco, 2003). Lieberman and Miller (2011) describe how educators must participate in learning communities in order to "create and

maintain an environment that fosters collaboration, honest talk, and a commitment to the growth and development of individual members and to the group as a whole" (p. 16). Meanwhile, Fishman et al. (2014) state, "effective designs for teacher CoPs support teachers in the sharing of diverse expertise, support them as they collaboratively construct professional knowledge bases, and support newcomers as they are "apprenticed" into increasingly expert practice" (p. 711). Glazer and colleagues (2005) also discuss how collaborative apprenticeship models in schools help to "build a community of practice among teachers integrating technology, which, in turn, enhances the impact of the model in practice" (p. 63). Furthermore, the ISTE organization advises that CoPs can provide ongoing support for teachers learning about technology while creating a collaborative space for exchanging ideas (Beglau et al., 2011).

Professional learning communities. In an effort to share leadership among administrators and teachers while focusing on student learning in a more collaborative environment, new reforms support *professional learning communities* (PLCs) in schools. Aligned with situated and social learning theories, this format of professional development promotes collective responsibility and commitment to school improvement through job-embedded learning. As part of this cultural shift, teachers primarily focus on their own knowledge and instructional strategies to address the needs of students while advancing their practice (Borko, 2004; DuFour et al., 2008; Hord, 2009, 2015; Lieberman & Miller, 2008, 2011, 2016; Mclaughlin & Talbert, 2006; Vescio et al., 2008; Wei et al., 2010).

Historically, the idea of PLCs was inspired by Senge's 1990 book, *The Fifth Discipline,* which suggested a paradigm shift in organizational structures that put employees in control of their professional development and learning (Hord, 2005). Senge (1990) describes a learning organization as "a place where people continually expand their capacity to create the results they

truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (p. 3). Soon this paradigm trickled into education, motivating researchers such as McLaughlin and Talbert (1993) to study professional communities within schools and how they enable teachers to learn new practices that engage students in learning (p. 9). Throughout their five-year investigation, they found that although schools differ drastically with how learning communities are defined and utilized among teachers, it was proven that “strong professional communities provide a context for sustained learning” (p. 18).

Hord (1997, 2005, 2008, 2015) additionally makes connections with Senge’s “learning organization theory” in her work with professional learning communities, although her model emphasizes reflective dialogue as key for collective learning. She refers to a PLC as “school professionals coming together as a group, in community, for the purpose of learning” (2008, p. 12). Hord also identifies five core dimensions of PLCs including: (a) supportive and shared leadership, (b) shared values and vision, (c) collective learning and application of learning, (d) supportive conditions, and (e) shared practice (2008, p. 12). Lieberman (1999a) similarly describes the concept of professional communities for teachers as “an innovative school contexts within which teachers learn new ways to work with students, build organizational supports that encourage teachers to collaborate, and engage students in more active forms of authentic learning” (p. 46).

Meanwhile, DuFour & Eaker (1998) define a professional learning community as “educators [creating] an environment that fosters mutual cooperation, emotional support, and personal growth as they work together to achieve what they cannot accomplish alone” (p. xii). Their model focuses on the importance of the principal’s role in promoting a school-wide

learning community through an inquiry process and less on how the collaboration should function. They outline six characteristics of PLCs: (a) shared mission, vision, values, and goals centered on student learning, (b) a collaborative culture with a focus on learning, (c) collective inquiry into best practice and current reality, (d) action orientation for learning by doing, (e) a commitment to continuous improvement, and (f) results orientation (p. 14). In their updated publication, "Revisiting Professional Learning Communities at Work," DuFour, DuFour, and Eaker (2008) define a PLC as "educators committed to working collaboratively in ongoing processes of collective inquiry and action research to achieve better results for the students they serve" (p. 14).

Although the defining characteristics of PLCs vary slightly, common themes include promoting shared leadership and decision-making, which stress the importance of collaboration in schools. A key feature of PLCs is that educators are given frequent opportunities to interact throughout a school year with intentional time dedicated for collaboration and reflection to inform individual and collective practice (DuFour et al., 2008; Hord, 2009, 2015; Lieberman & Miller, 2008, 2011, 2016). McLaughlin and Talbert (1993) suggest that opportunities for collaborative inquiry among teachers promote a shared body of wisdom in the profession (p. 20-21). Similarly, Marx, Blumenfeld, and Krajcik (1998) discuss the benefits of teacher collaboration such as accessing new ideas or information, clarifying beliefs, examining different ways of thinking about teaching, and reflecting on their practice (p. 34), which aligns with the arguments Little (1990a, 1990b, 2002, 2003) makes on promoting collegial interaction to strengthen teaching and learning in schools.

Cifuentes, Maxwell, and Bulu (2011) conducted a two-year study exploring the impact of using a PLC to support technology integration across three rural school districts. The "STAR

learning community" was designed to "facilitate expansion of teachers' technical skills, comfort with technology, knowledge of resources, and knowledge of implementation and classroom management strategies when integrating technologies" (p. 63). Meetings included opportunities for: (a) engaging in learning to integrate technologies in the adopted curriculum, (b) establishing the added pedagogical value when integrating technologies, (c) sharing insights regarding implementation issues, and (d) discussing preparation of classrooms for project-based learning (p. 66). In survey responses, teachers indicated that they appreciated being able to visit other schools in their district to see examples of effective technology integration and they expressed a strong desire to continue working in learning communities. Overall, teachers found participation in PLCs to be an effective form of professional development—particularly for technology integration because of the collaborative opportunities and ongoing support provided (p. 79-80).

Hord (2009) describes how through PLCs, "learning is not an add-on to the role of the professional. It is a habitual activity where the group learns how to learn together continuously" (p. 40). This aspect of continuous learning is key for professional development with technology integration, especially when new innovations are constantly being introduced in the contemporary education landscape. It has also been recognized that support can be received from collaboration in schools or elsewhere. As Darling-Hammond and colleagues (2017) argue, a powerful form of teacher learning comes from belonging to professional communities that extend beyond the school (p. 18). Accordingly, teachers are beginning to form PLCs outside of their schools and across virtual spaces (Little & Housand, 2011; McConnell, Parker, Eberhardt, Koeler, & Lundeberg, 2013; Polly & Hannafin, 2010; Vavasseur & MacGregor, 2008).

Professional Learning with Technology

With continuous advances in technology, online spaces offer further opportunities for "just-in-time" learning, knowledge sharing, and collaboration across geographic boundaries. As a result, many teachers have turned to online spaces to overcome isolation, to exchange ideas or resources, to build connections with other teachers, and to support new knowledge creation through knowledge-building communities and communities of practice (Beach, 2012; Booth, 2012; Corcoran & Quattrocchi, 2014; Duncan-Howell, 2010; Jones & Dexter, 2014; Macià & García, 2016; Riel & Polin, 2004; Robson, 2016; Schlager & Fusco, 2003; Trust, 2015). Beach (2012) describes how, "teachers can capitalize on the affordances of digital tools and social networking capabilities to collaborate, plan with, and learn from other teachers in their own school, as well as teachers in other schools across the country" (p. 256). Through a repository of digital artifacts and other sources of information, teachers can access and shape knowledge from shared experiences, extending the boundaries of their classroom or school communities to the larger world, According to Wenger and colleagues (2012), "technology has changed how we think about communities, and communities have changed our uses of technology" (Kindle Locations, 741-742). Communities are expanding across online spaces and technology has revolutionized participation by mediating interactions while building capacity for immediate information exchange (Barab et al., 2004; Booth, 2012; Lock, 2006; Schlager & Fusco, 2003; Wenger et al., 2012). Wenger and colleagues (2012) also discuss how, "technology contributes to both participation and reification," by connecting people and by providing new ways to reify knowledge in order to "produce, store, share, and organize documents, media files, links, and other artifacts, whether they are collectively or individually created" (Kindle location, 1492).

Hew and Hara (2007) researched why teachers are motivated to share knowledge in online communities and found the following motivators: (a) collectivism- teachers share knowledge to improve the welfare of community members, (b) reciprocity- teachers want to share knowledge because they have received help from others and want to give back, (c) personal gain- sharing knowledge helps teachers gain new knowledge, and (d) altruism- teachers feel empathy for other teachers' struggles and would like to support them by sharing suggestions (p. 576). Similarly, in a study examining resources for teacher participation in online communities of K-12 teachers, Hur and Brush (2009) found that teachers wanted to participate for the following five reasons: (a) sharing emotions, (b) utilizing the advantages of online environments, (c) combating teacher isolation, (d) exploring ideas, and (e) experiencing a sense of camaraderie (p. 290-291). Results also indicated that teachers felt they could have more open discussion and ask for help without fear through anonymous participation in online communities (p. 298). Furthermore, many teachers find that online communities and networks provide personalized learning opportunities that are flexible with their busy schedules and they promote ongoing teacher interaction (Beach, 2012; Carpenter et al., 2016; Diamond & Gonzalez, 2014; Hew & Hara, 2007; Hur & Brush, 2009; Macià & García, 2016; Trust, 2012, 2016). As Lieberman (2000) argues, "networks are organized around the interests and needs of their participants, building agendas sensitive to their individual and collective development as educators. They can change quickly and invent new structures and activities that are responsive to their members" (p. 221-222).

Consequently, online spaces offer new ways to think about professional development for sustained support that teachers may not receive in their schools without the constraints of time, space, and scale that limit offline interactions (Booth, 2012; Hur & Brush, 2009; Kraut &

Resnick, 2012; Marx et al., 1998; Parr & Ward, 2006; Polly & Hannafin, 2010). In a literature review of informal online communities and networks as a source of professional development, Macià and García (2016) found that teachers were motivated to participate with the aim to: (a) improve their teaching practice by accessing resources, advice, new ideas, (b) share experiences, knowledge, and materials, (c) receive and provide emotional support, (d) develop collective projects and offer skills training and, (e) enlarge their professional community (p. 297-301). As Dede, Ketelhut, Whitehouse, Breit, and McCloskey (2009) advocate, online professional development "draws on powerful resources often not available locally, and that can create an evolutionary path toward providing real-time, ongoing, work-embedded support" with opportunities for reflection (p. 9). Other affordances include proximity to practice, an additional set of tools that allow teachers to become fluent in new technologies, and the ability for teachers to move at their own pace without limitations (Dede et al., 2009; Fishman et al., 2013; Gamrat, Zimmerman, Dudek, & Peck, 2014; Marx et al., 1998; Lock, 2006; Polly & Hannafin, 2010). Polly and Hannafin (2010) also argue that "online professional development programs have been found to promote teacher ownership of their learning, as participants choose the focus of their learning, and complete tasks at times that are chosen by them" (p. 563). With purposeful selection, technology has the potential to improve professional development by providing new spaces to facilitate learning and collaborative inquiry. Ultimately, teachers will begin to recognize how new technologies can enhance their learning and they will implement similar strategies within their teaching to support students (Beach, 2012; Fishman et al., 2003, 2013; Lawless & Pellegrino, 2007; Lock, 2006; Marx et al., 1998; Polly & Hannafin, 2010).

Teacher networks. Networking can be defined as making connections with others through personal or professional relationships that involve the exchange of information via spontaneous and short-lived interactions (Brown & Duguid, 2001; Brown et al., 2017; Trust, 2012, 2016; Wasko & Faraq, 2005; Wenger et al., 2012). Networks traditionally consist of people, places, and resources where one might seek knowledge to solve problems, accomplish specific goals, or to establish connections (Warlick, 2009; Wenger, Trayner, & de Laat, 2011). Lieberman (1999a) refers to networks as "external learning communities" that provide a "balance between inside-knowledge of practitioners and outside knowledge of reformers and researchers" (p. 47). Meanwhile, Brown and Duguid (2001) discuss how people within a practice collectively share knowledge through communities of practice (CoPs) and networks of practice (NoPs), although NoPs focus less on the social relationship building aspect and are more loosely connected across organizations and geographically distributed spaces.

NoPs are further distinguished as "occupational groups," where members are often unknown to one another (Brown & Duguid, 2001; Brown et al., 2017; Wenger et al., 2011). Unlike in CoPs, most of the people within a network never actually meet and information is often indirectly exchanged through distant professional colleagues, newsletters, websites, blogs, bulletin boards, listservs, Twitter, other aggregators, etc., (Carpenter, 2016; Carpenter & Linton, 2016; Carpenter et al., 2016; Trust, 2012, 2016; Trust et al., 2016; Warlick, 2009; Wasko & Faraq, 2005; Wenger et al., 2012). Whereas according to Brown and colleagues (2017), CoPs are subsets of larger NoPs, and members "continually negotiate with, communicate with, and coordinate with each other directly in the course of work" (p. 133). Wenger et al. (2011) additionally emphasize how in CoPs, members have a shared identity, taking on roles through legitimate peripheral participation that can include collaboration and mentoring to "steward a

domain knowledge and sustain learning about it," while networks are more generally referred to as "a set of nodes and links with affordances for learning, such as information flows, helpful linkages, joint problem solving, and knowledge creation" (p. 9). Moreover, they believe that "participation in networks does not require a sustained learning partnership or commitment to a shared domain and instead participation involves forming a web of information sources that may be initiated by the learner or others" (p. 12).

Networks promote peer-to-peer learning while providing ongoing support, which is especially powerful for pooling intellectual resources and practitioner knowledge (Darling-Hammond, 2009; Stewart, 2012; Trust, 2012, 2016). As Wasko and Faraq (2005) describe, "organizational members benefit from external network connections because they gain access to new information, expertise, and ideas not available locally, and can interact informally, free from the constraints of hierarchy and local rules" (p. 36). In other words, networking can be used for collaboration, informal knowledge sharing, and as a method of professional development that is independent of the workplace setting. Hence, many teachers overcome isolation by utilizing networks for support outside of their schools and districts while building social capital and exchanging ideas or practices (Carpenter et al., 2016; Lieberman, 2000; Schlager et al., 2009; Trust, 2012, 2016; Trust et al., 2016; Warlick, 2009). McLaughlin and Talbert (2006) additionally discusses how these opportunities have "spanned boundaries between the school and the district central office, and between the school and professional networks outside the district, to broker resources for the development and learning of the school community," thus promoting teacher growth on a larger scale (Kindle Locations, 1137-1139).

Before other research was conducted on networking in education—especially with new technologies, Lieberman (1999a, 1999b, 2000) presciently advocated that networks with external

schools provide a major conduit for engaging teachers in learning and motivating them toward improving their practice while promoting change. She claims that collaborative relationships formed across networks and communities advance teachers' identities and support their professional development in a loose and flexible format. Additionally, Lieberman (1999a) believes that networks build a commitment to lifelong learning because teachers "become more open to the outside—to their own peers as well as to other scholars and researchers" (p. 46). She argues that networks provide: "opportunities for teachers to both consume and generate knowledge; a variety of collaborative structures; flexibility and informality; a chance to work across school and district lines, and a community that respects teachers' knowledge as well as knowledge from research and reform" (1999b, p. 43). Furthermore, Lieberman (2000) describes how networks "mount agendas that give teachers opportunities to create as well as receive knowledge," especially since they are "organized around the interests and needs of participants" (p. 226).

The terms "personal learning network" (Tobin, 1998) and "professional learning network" (Flanigan, 2011; Ivanova, 2009; Lieberman, 1995, 2000; Trust, 2012, 2016; Trust et al., 2016), abbreviated as PLNs, are used to describe networks of people and resources that support ongoing learning either personally or professionally. Many teachers are finding opportunities for informal learning through PLNs, where they can share ideas, seek resources, and obtain feedback or help from peers and outside experts (Carpenter et al., 2016; Lieberman, 2000; Schlager et al., 2009; Trust, 2012, 2016; Trust et al., 2016; Warlick, 2009). With new tools and technologies providing instant connections to people and information globally, networks continue to expand rapidly across online spaces. Carpenter and colleagues (2016) describe online

spaces for PLNs as "virtual workrooms," since teachers are making connections and collaborating "beyond the walls of their schools to grow in their teaching" (p. 24).

Siemens (2005, 2014) further defines networks as "connections between entities" (p. 4) and he terms "connectivism" as a model for understanding learning, which occurs as individuals connect with others via networks across online spaces. From a *connectivist* perspective, knowledge is distributed among the network in a cyclical process as learners gather new information, modify their beliefs, and share when reconnecting within a network. In other words, knowledge is continuously acquired and expanded upon as it flows through social networks or "hubs" of connected people, thus aligning with constructivist and social learning theories. Technology mediates these connections and supports the construction of ever-changing knowledge while storing information through a variety of digital formats that can be referenced and adapted at any time or place (Bell, 2011; Downes, 2008; Kop & Hill, 2008; Schmidt et al., 2009; Siemens, 2005, 2014; Siemens & Conole, 2011).

Jenkins (2006) similarly explains how technical innovations have created new cultural practices. He describes "participatory culture," as "a response to new media technologies that make it possible for learners to archive, annotate, appropriate, and recirculate media content" as they participate in online communities and networks (p. 155). Specifically, Jenkins discusses how fans and gamers connect to generate, publish, and distribute content based on common interests, although this now includes a much broader range of people. Likewise, Gee (2004) refers to these informal physical and virtual learning environments as "affinity spaces," where people are connected by "a shared interest or endeavor" (p. 4). Affinity spaces are organized by content and interactions, which encourage individual and distributed knowledge through

mediating devices. Additionally, they depend on peer-to-peer teaching and learning as participants tap into the expertise of others.

Ivanova (2009) calls this, "knowledge fusion" and discusses how Web 2.0 applications allow information to be created, published, stored, circulated, and remixed as learners meet online to pool, share, and reuse their resources. She also uses the term professional learning network (PfLN) to describe the "facilitation of knowledge absorption, assimilation and dissemination," which can be used in formal and informal learning processes (p. 1). She believes that *personal learning environments* (PLEs) are formed first, connecting individuals to data, information, and knowledge. As interactions begin to take place, personal and professional networks develop so that ideas, resources, and artifacts may be shared to build further connections. Lastly, collaboration occurs and members of the network contribute to the expansion of knowledge.

In his later work, Jenkins and colleagues (2013) also describe how media spreads through affinity spaces and social networks, allowing learners to share and move content across a cultural landscape (p. 3). After being retrofitted, media is dispersed via online connections and social media platforms. For example, people can create and upload videos within YouTube that are then embedded on blogs or websites and spread across platforms such as Facebook or Twitter. Moreover, unfinished content may be shared with the aim for others to contribute, which Jenkins says drives individual and "collective intelligence" (Levy, 2000). A networked culture is key for circulating information, and when media is rapidly distributed, it is referred to as "going viral" because of how quickly it spreads (Jenkins et al., 2013, p. 17). Consequently, many researchers argue that teacher networking and participation in affinity spaces (Gee, 2004, 2012) serves as a form of professional development because it spreads knowledge about the practice

while building connections via PLNs (Carpenter et al., 2016; Jenkins et al., 2006; Schlager et al., 2009; Trust, 2012, 2016; Warlick, 2009).

Innovative Professional Development Methods with Technology

In addition to utilizing online spaces for resources and participation in virtual CoPs, NoPs, or PLNs, teachers have also begun to explore other professional development opportunities available outside of their schools and districts. Third parties (i.e. technology vendors) offer some of these opportunities and they incorporate innovative methods with technology such as micro-credentials and digital badges for learning achievements. Digital badges may be earned upon completion of specific activities in MOOCs, micro-credential programs, or programs sponsored by technology vendors (e.g. Apple Teacher, Google for Education: Teacher Center, and Microsoft Educator Community). These unique programs offer teachers autonomy and choice in what technology skills they wish to improve and how they want to learn about them. Moreover, digital badges and prestigious titles earned within them provide recognition and potentially incentive to participate— even if there are no "Continuing Education Units" (CEUs) or in-service hours given (Carpenter et al., 2016; CTQ & Digital Promise, 2016, 2017; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; Singer, 2017; Trust, 2012, 2016; U.S. Department of Education, 2016).

Digital badges for professional learning. As a form of motivation and recognition, digital badges act as symbols, tokens, or icons that incentivize professional learning while demonstrating proficiency in specific skills (Ferdig, Pytask, Nickerson II, & Smith, 2017; Gamrat et al., 2014; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2015; Mozilla Alliance for Excellent Education, 2014; Willis III, Flintoff, & McGraw, 2016). Simply put by Finkelstein, Knight, and Manning (2013), "digital badges are a new way to capture and communicate what

an individual knows and can demonstrate" (p. 1). Badges are sometimes earned by completing micro-credentials that document competency-based evidence of educators' learning and skills, which are more focused than certificates, diplomas, or degrees. Digital badges provide a visual representation of professional accomplishments that can be awarded by institutions, organizations, communities, groups, or individuals. These symbolic representations often contain metadata that can be hyperlinked with details about the issuer, recognition, and evaluation criteria for learning that can be displayed on curriculum vitae, resumes, websites, blogs, network or community profiles, etc. to showcase particular skills, experience levels, and accomplishments. Badges may also be linked to evidence of learning that can include artifacts, documents, or testimonials. Consequently, this allows members of online networks or communities to identify badge earners as 'more knowledgeable others' based on their skill sets and expertise, thus promoting peer-to-peer learning (Abramovich, Schunn, & Higashi, 2013; CTQ & Digital Promise, 2016, 2017; Ferdig et al., 2017; Gamrat et al., 2014; Gibson, et al., 2015; Grant, 2014; Mozilla Alliance for Excellent Education, 2014).

Historically, badges were first given to knights as recognition for the completion of a pilgrimage or to mark political allegiance, and they have similarly been used in the military to display rank or represent achievements. Merit badges are also awarded to Boy Scouts or Girl Scouts when specific skills are accomplished to showcase their learning progress (Diamond & Gonzalez, 2014; Gibson et al., 2015; Priest, 2016). The concept of digital badges became popular in video gaming when Microsoft introduced "Gamerscore" with the Xbox 360 in 2005, where players could earn badges as they moved through various levels of games, which continued to spread through the industry (Gibson et al., 2015; Priest, 2016; Willis III et al., 2016). Digital badges first made an appearance in the education realm when Massive Open Online Courses

(MOOCs) began issuing them as recognition upon completion, especially in cases where college credit might not be received but participants wanted some form of verification to show their learning. This has resulted in the rise of digital badges as a "digital transcript or learning narrative" to highlight development across informal and formal education with the potential to become an alternate credentialing system (Ferdig et al., 2017; Gibson et al., 2015, Law, 2015; Willis III, et al., 2016).

Digital badges are frequently used as a motivation tactic to promote engagement and learning since they typically require focused goals to be accomplished via challenging tasks. For instance, badges can be received from participation in online activities, completing a course, module, or micro-credential, reaching performance benchmarks, and successfully passing informal or formal assessments that often include submission of learning evidence (Catalano & Doucet, 2013; CTQ & Digital Promise, 2016, 2017; Ferdig et al., 2017; Grant, 2014; Willis III et al., 2016). When "gamification" strategies such as points or leaderboards with a ranking order are incorporated in online communities to publicly display these forms of achievement, earning badges can even become competitive as members strive to be in first place or have the most honors (Gibson et al., 2015; Willis III et al., 2016). Additionally, Mozilla Alliance for Excellent Education (2013) describes how, "the value of a badge to an earner increases when it is portable, can be stacked to demonstrate multiple achievements, and can be shared with a variety of audiences, as determined by the earner" (p. 3-4). There are even open badge ecosystem tools like *Mozilla Backpack, BadgeOS, Badgelist, Credly, EdTechBadges* for example, that store badges across websites or other online platforms. As a result, digital badges are a rewarding form of validation with benefits that can have a significant impact in education settings (Abramovich et

al., 2013; Diamond & Gonzalez, 2014; Ferdig et al., 2017; Gibson et al., 2015; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; U.S. Department of Education, 2016).

According to the Center for Teaching Quality (CTQ) and Digital Promise (2016), this emerging approach empowers teachers to "identify and develop important skills, submit evidence of their competence, and earn digital badges verifying their expertise," while school systems can utilize "resulting data to inform decision-making about investments in professional learning to most effectively support teaching practice" (p. 4). For these reasons, CTQ and Digital Promise have created a framework for programs that issue micro-credentials to ensure that they are backed by research and evidence-based. This framework includes the following components: (a) a definition of the specific competency, (b) a key method to achieve that competency, (c) research and resources to support the key method and competency, (d) a description of the evidence and artifacts that must be submitted to demonstrate competency, and (e) a rubric and scoring guide for how that evidence will be assessed (CTQ & Digital Promise, 2016, p. 9). Based on the framework, there were over 300 micro-credentials offered in June 2017 and 5,000 submissions in July 2017 from educators across approximately 550 districts (CTQ & Digital Promise, 2017, p. 2). The CTQ, Digital Promise, and other partners are continuing to work with states, schools, and districts to provide formal recognition for teachers who earn micro-credentials. They firmly believe that micro-credentials integrate informal modes of personalized and on-demand learning with professional learning, while giving teachers collective ownership of their profession (CTQ & Digital Promise, 2016, 2017). Although there are currently only nine states offering CEUs for teachers earning micro-credentials in the Digital Promise ecosystem, most micro-credentials and digital badges are commonly offered outside of traditional education institutions (CTQ & Digital Promise, 2017, p. 3). In fact, technology vendors such as Apple,

Google, IBM, and Microsoft are now offering badges to teachers who demonstrate proficiency and creativity using their products in education (Singer, 2017).

Digital badges have the potential to impact professional learning because they offer an alternate form of assessment and they can be used as a feedback mechanism (Abramovich et al., 2013; Davidson, 2011; Finkelstein et al., 2013). As Finkelstein and colleagues (2013) discuss, "badges can be used to help adult learners set goals and measure progress; identify the steps needed to learn larger concepts; create a sense of affiliation with others working toward similar goals; and provide a platform for mentoring and peer support for other students who want to achieve that skill, to share their accomplishments with others, and create social and professional reputations" (p. 37). Meanwhile, Gibson et al. (2015) claim that "the affordances of digital badges for education can be categorized into four key areas: (a) motivation, (b) recognition and credentialing, (c) evidence of achievement, and (d) research on the linkages among and impacts of the affordances" (p. 407). Considering these advantages, many researchers advocate that digital badges can transform professional development because they offer opportunities for personalized learning that are driven by learner motivations (Abramovich et al., 2013; Gibson et. al., 2015; Grant 2014; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016).

Mozilla Alliance for Excellent Education (2013, 2014) discusses using badges as "a bridge between informal and formal education settings, encouraging connections between in- and out-of-school learning" (p. 6). They describe how badges provide a "learning map" or "custom pathway" that allow learners to choose what skills they believe are necessary based on their individual goals. They also explain how teachers can earn badges for "re-imagining learning and get recognition for innovation and new skills important for facilitation and teaching in the twenty-first century" (p. 10). Additionally, Gamrat and colleagues (2014) conducted a study of

digital badging within a teacher professional development program, examining 36 teachers' experiences as participants in the "Teacher Learning Journeys" (TLJ) badging system. Findings suggest that digital badges are powerful tools for professional development with teachers (Gamrat et al., 2014).

Moreover, the United States Department of Education endorses micro-credential programs offering digital badges in the 2016 National Education Technology Plan. They argue that educators "benefit from earning micro-credentials because they can gain recognition for new discrete skills they learn throughout their careers" and they mention the nonprofit organization, Digital Promise, while acknowledging their research-driven micro-credentialing system for teachers' professional learning (U.S. Department of Education, 2016, p. 62). According to Dr. Terry Grier (2015), Superintendent of the Houston Independent School District, who has launched a global learning initiative with 51 elementary schools for online professional development and a customized digital badging system, there are five key features of badges in education: (a) badging requires demonstrating understanding and implementation of a target content or skill, (b) badging provides recognition and motivation, (c) badging allows for knowledge circulation among teachers, (d) badging can be tracked and assessed, and (e) badging is a scalable enterprise (p. 1).

Technology vendors. As technology usage continues to expand within schools, there are many companies or vendors marketing their hardware and software products for educational uses. While it may appear that they are focused solely on selling these products, they have also invested heavily into providing professional development opportunities for teachers to support student learning with new technologies. Besides concentrating on technical skills for using particular products, many of these programs also aim to promote contemporary pedagogical

practices that will ultimately impact the new generations of users. Additionally, they are building collaborative communities across online spaces with in-person meeting opportunities at onsite conferences or in their own academies to promote continued professional learning (Apple Education, 2018, Baker et al., 1985; Dwyer, 1994, 1995; Google for Education, 2018; Ishizuka, 2004; Microsoft Educator Community, 2018; Microsoft Peer Coaching Program, 2015; Ringstaff & Kelley, 2002; Singer, 2017). This dissertation will focus on three American multinational technology companies, Apple, Google, and Microsoft with regard to their professional development programs for educators.

Apple. Apple Inc. (previously Apple Computer Inc.) is known for the Macintosh computer, iPod portable media player, iPhone smartphone, and iPad tablet among other technology innovations. In an effort to promote technology integration in education, Apple has developed professional learning programs to support teachers with their products (Apple Education, 2018). According to Apple (2018), "*Apple Teacher* is a free, professional learning program designed to support and celebrate teachers. It empowers all educators—new to the profession or experienced faculty—to feel more confident using Apple products for learning and teaching" (Apple Teacher at Your School, 2018, p. 2). Through the online *Apple Teacher* Learning Center (ATLC), there are *Apple Teacher* Starter Guides containing learning materials aligned with the ISTE standards and suggested projects to develop teachers' skills with iPad, Mac, and built-in applications such as GarageBand, iMovie, Keynote, Pages, and Numbers. They also include a starter guide for teaching coding with Swift Playgrounds. At the end of each starter guide, there are interactive quizzes that teachers can take at their own pace to earn digital badges. Following the completion of all eight quizzes for Mac or iPad, participants earn recognition as an *Apple Teacher*, which includes a certificate and signature logo that can be

added to resumes or social media platforms. Additionally, they are able to access the *Apple Teacher* Community, which features a database of educational resources developed by and for teachers. They can also design their own Apple Classroom as a virtual space to compile lessons and other teaching materials that can be shared with students.

Apple suggests that teachers receive credit for professional learning depending upon district or school requirements. Each starter guide is estimated to take about 2 hours to work through, for a total of 16 possible hours on either the iPad or Mac option. Apple also provides presentations, agendas, and formats for implementing this program school-wide or across districts, especially if they are using Apple devices with students. Additionally, the Apple Store offers free "Teacher Tuesday" sessions for those who need hands on support and they offer scheduled meetings with Apple Professional Learning Specialists for more advanced opportunities to "help educators support deeper student learning through research-based instructional technology practices" (Apple Education, 2018).

Once teachers have received the *Apple Teacher* recognition, they can also pursue the prestigious title of *Apple Distinguished Educator* (ADE) by submitting an application, providing evidence of exceptional technological use of Apple products, and being recommended by an Apple employee. Apple established the ADE program in 1994 to ”recognize K–12 and higher education pioneers who are using Apple technology to transform teaching and learning” (Apple Education, 2018). Selection into the program is extremely competitive and a limited number of applicants are accepted at all levels of education, with only up to two teachers being permitted from the same school. Educators who are selected to join the ADE program must attend an intensive training institute and are encouraged to be active participants in the online community, which includes forums for discussions, groups, blogs, a gallery for creating photo albums of

experiences, a member directory, and a team of moderators. *ADE*s can develop a profile in the community and begin sharing their expertise in applications and technology tools. Furthermore, they may voluntarily publish lessons, courses, ibooks, and free resources for other educators without receiving compensation from the company. They also continue to participate in the annual meetings to connect in person with other ADEs globally. Apple Education (2018) refers to *ADE*s as "trusted advisors, authentic authors, passionate advocates, and global ambassadors, who work together to develop and promote powerful ideas for improving teaching and learning worldwide." As of May 2018, there are 2,584 ADEs worldwide across 45 countries. Moreover, Apple recognizes schools demonstrating educational excellence with Apple products and there are currently 400 schools across 29 countries that have been honored as Apple Distinguished Schools (Apple Education, 2018).

***Google for education*.** Google, known for its search engine and other Internet-related services, has developed a program specifically for teachers, learners, researchers, and organizations, referred to as Google for Education or G Suite for Education. It features customizable tools for productivity and collaboration that can be shared within individual school or district domains. The tools include web-based applications (i.e. Google Calendar, Google Drive, Google Documents, Google Forms, Google Slides, Google Sheets, Gmail, Google Hangouts, etc.) similar to office suites for word processing, building spreadsheets, graphics, or presentations, in addition to providing email and communication services. They have also developed Google Classroom as a free resource, which is a virtual space where teachers can create classes, distribute assignments, send feedback, and review students' progress in one place (Google for Education, 2018). Google Classroom enables teachers to provide instant feedback and to track students' progress in order to improve performance (Google for Education, 2018).

Google also sells Chromebooks as affordable laptop computers that schools can purchase to connect with these tools and they utilize the Google Cloud Platform for storage. Moreover, there are Google Plus Communities that include Google Educator Groups and a Google IT Admin Portal for teachers, education technology coaches, and administrators working in Information Technology to collaborate online.

As part of the Google for Education program, the Teacher Center was developed for teachers to learn about Google tools and applications specifically for K-12 or higher education settings with opportunities to earn certificates and digital badges that showcase their skills. This program was awarded the ISTE Seal of Alignment for "providing educators worldwide with the professional development necessary to effectively leverage technology in their classrooms" (Google for Education, 2018, ISTE, 2018). It is also accompanied with a Google Professional Development Handbook that reviews all learning opportunities provided by Google. Within the Google Training Center, there are tiered programs to become a *Google Certified Educator, Google Certified Trainer,* or if selected through a competitive process, a *Google Certified Innovator*. Each option includes "a combination of learning content, assessments, and experience to demonstrate proficiency, with the highest honor, *Google Certified Innovator*, requiring an application and participation in the Innovator Academy upon selection." The training center provides the following descriptions of each certification program:

- ***Google Certified Educator****:* Designed for educators and classroom teachers who wish to demonstrate proficiency in using Google for Education tools. The **Level 1** status indicates that an educator is able to successfully implement G Suite for Education into their teaching practice in order to enhance teaching and learning. The **Level 2** status indicates

that an educator is able to successfully integrate a wider range of Google for Education tools and other technologies in order to transform their teaching practice.

- ***Google for Education Certified Trainer****:* Google for Education Certified Trainers are passionate and driven education professionals with a desire to help others transform classrooms with technology. Whether you are a school's go-to technologist, a stellar classroom teacher or an enterprising consultant, anyone is welcome to apply for membership in the program.
- ***Google for Education Certified Innovator****:* Designed for education thought-leaders who create new and innovative projects using Google for Education tools (Google for Education, 2018).

According to Google for Education, "Certified Innovators are selected based on their professional experience, their passion for teaching and learning, their innovative use of technology in school settings, their potential to impact other educators, and their desire to tackle some of the biggest challenges in education. They are ambassadors for change who empower other educators and students through a thriving innovation culture in their own classrooms, schools, and organizations" (Google for Education, "Who Should Join," 2018). Program benefits include: a digital badge and pin, visibility in the Google for Education Directory, monthly learning and development resources, membership in a collaborative community of innovators, exclusive looks at new Google for Education launches, and the ability to serve as product ambassadors in focus groups, along with their Innovation Projects being showcased online (Google for Education, "Why Should I Join," 2018). Upon completion of the Advanced Course and Google Certified Educator Level 2 exam, interested educators are eligible to submit an application that includes a "YouTube Challenge" video highlighting their history of promoting

innovation in their school or district. The process is rather competitive and Google limits the number of Innovators in each cohort to "ensure a high quality experience and help build community" (Google for Education, "Teacher Center, Certification Policies and FAQ," 2018). If educators are selected, they will participate in *the Innovator Program* and the three day Innovation Academy, which provides an opportunity to meet with a global cohort of other educators. Furthermore, they will receive support as they develop their own "Innovation Project" (Google for Education, "How Can I Join," 2018).

In addition to these certifications, *Google* offers the following courses: Devices Training (for Chromebooks and Android tablets), Digital Citizenship and Safety, and Tools for Diverse Learners (Google Training Center, 2018). On their resources page, they also include programs on computer science, computational thinking, coding, applied digital skills, Google Expeditions for virtual reality field trips, the Google Science Fair, and the Dynamic Learning Project, which is a program implemented in schools and districts designed to help address the digital use divide by helping teachers learn to incorporate technology into their classrooms in impactful ways with instructional technology coaches. Moreover, the Google for Education Directory provides a detailed listing of their partners who offer professional development opportunities and a search filter for educators to look for specific topics covered.

Microsoft. Microsoft Corporation is recognized for its' Microsoft Windows operating system, Microsoft Office suite of productivity software, and the Microsoft Internet Explorer web browser, among other technology innovations. As part of their outreach strategies, the company believes in empowering educators and has developed several professional development programs such as the *Innovative Schools Program, Peer Coaching Program* (MPC), *Partners in Learning Program*, and *Microsoft Innovative Educator* programs, in addition to hosting the *Innovative*

Teachers Forum (ITF) and the *School of the Future* (SOF) *World Summit* (Microsoft Educator Community, 2018). According to Microsoft, the *Microsoft Innovative Educator* (MIE) programs recognize global educator visionaries using technology to pave the way for better learning and student outcomes" (Microsoft Educator Community, 2018). These programs are designed for educators who want to learn new skills and showcase their work with Microsoft products, such as Office 365 tools including: Word, Excel, Publisher, PowerPoint, OneNote, OneDrive, Outlook, Exchange, Sway, Skype, etc. In the Microsoft Educator Community, points and digital badges are earned for successfully completing courses and by contributing within the online community.

When participants add content using the Microsoft applications that are shared on their user-profile, via social media platforms, or in the Microsoft Classroom (a virtual space for creating assignments and sharing resources with students), they also earn recognition in the form of badges. Microsoft encourages school administrators to integrate the Microsoft Educator Community into teacher training and professional development programs. With regard to courses offered, there are a variety of learning pathways depending on educators' interest, needs, and skill levels. Examples of courses include: Teacher Academy Office 365, Accessibility for Office 365, Teacher Academy Windows 10, Introduction to Microsoft in the Classroom, Introduction to Skype in the Classroom, Teaching with Technology Basics, Technology Enriched Instruction, 21st Century Learning Design, Computational Thinking: It's Importance in Education, Teach Creative Coding through Games and Apps, Design Learning through Transformative Pedagogy, Design Thinking for Leading and Learning, Digital Citizenship, etc. Badges can additionally be earned from learning about or training others in Minecraft and similarly from active involvement in the Skype community. Furthermore, they offer license subscriptions to their Microsoft

Imagine Academy (MSIA) and a Digital Resource Kit (Microsoft Educator Community, 2018). Upon completion of courses, community participants can also work toward higher honors that include recognition as a: *Microsoft Innovative Educator (MIE), Microsoft Innovative Educator Trainer, Microsoft Innovative Educator Expert,* and *Skype Master Teacher*. The following descriptions are provided for each program:

- ***Microsoft Innovative Educator****:* MIEs use Microsoft tools in the classroom and have learned the fundamentals of some of these tools. This is the first step on a journey of joining a professional learning network of enthusiastic educators who come together to learn, share, and grow. They are required to earn 1,000 points in the Microsoft Educator Community.
- ***Microsoft Innovative Educator Trainer***: *MIE Trainers* are educators, government or district trainers, professional development specialists, or affiliates who want to train educators and school leaders on the effective use of technology in teaching and learning. They are required to complete either a two-day in-person "Trainer Academy" or an online "Trainer Academy: and commit to and report training 100 educators per year to become an official MIE Trainer. ***MIE Master Trainers*** may be recognized after serving as an MIE Trainer for at least one year and obtaining a Microsoft referral. They are required to train/educate a minimum of 400 educators per year while recording each session in the Microsoft Training Tracker, providing summaries of course evaluations, and continuing to explore new Microsoft products, services, and technologies.
- ***Microsoft Innovative Educator Expert***: *MIE Experts* work closely with Microsoft to lead innovation in education to advocate and share their thoughts about the effective use of technology in education with peers and policymakers, provide insight for Microsoft on

new products and tools for education, and exchange best practices as they work together to promote innovation in teaching and learning.

- ***Skype Master Teacher***: The *Skype Master Teacher* program recognizes educators who use Skype in the Classroom actively and lead innovation in education through the use of Skype. This program celebrates global education and learning as it breaks down classroom walls and brings the world in (Microsoft Educator Community, 2018).

Applicants interested in pursuing a leading role as a *Microsoft Innovative Educator Expert*, must begin by creating a profile in the Microsoft Educator Community, earning 1,000 points by completing online training courses toward digital badges, become a Certified MIE, and "create a 2-minute video or Sway presentation" that describes how they have innovatively incorporated Microsoft technologies in their classroom with artifacts demonstrating this. Benefits of this recognition include: (a) access to professional and career development opportunities and certifications, (b) ability to share expertise with world-renowned educators and specialists to scale their innovations, (c) opportunities to build educator capacity in the community by speaking, training, and/or coaching colleagues, (d) participation in focus groups while giving feedback to development teams on Microsoft products, (e) early testing of new products in beta form and participation in pre-release programs for education related-tools, (f) collaborating with innovative educators around the globe, (g) hosting regional events to showcase Microsoft technology in the classroom, and (h) the potential to be nominated as a *Skype Master Teacher*. In order to maintain these benefits and the MIEE title, educators are also required to reapply each year (Microsoft Educator Community, 2018).

Chapter Summary

As technology becomes more ubiquitous in society, attention to its impact in education has steadily increased. Schools play a major role in preparing students for the future, which includes developing students' technological literacy and 21st century skills. Accordingly, teachers must be given opportunities to learn how to integrate technology in their instruction with meaningful learning activities that are student-centered. Researchers identify that technical skills and pedagogical knowledge are both crucial components for successful technology integration (Harris et al., 2009; Koehler & Mishra, 2005; Thompson & Mishra, 2007; Tondeur et al., 2017; Zhao, 2003). Although teachers understand the importance of technology as a tool to support learning, many are not integrating it effectively within their curriculum. Therefore, teachers continue to need further guidance through professional development (Culp et al., 2003; ISTE 2016, 2017; Ertmer, 1999, 2005; Ertmer et al., 2012; Hew & Brush, 2007; Hixon & Buckenmeyer, 2009; O'Neal et al., 2017; Tondeur et al., 2016; Twining et al., 2013; U.S. Department of Education, 2016).

The literature shows that traditional models of professional development have consisted of structured courses, workshops, or conferences delivered by outside experts from a "top down" approach that lacks relevance and meaningful connections (Butler et al., 2004; Darling-Hammond, 2009). These highly structured, "one size fits all" formats are considered surface level and episodic, and are regarded as ineffective at promoting change in teachers' practice, particularly because they are not aligned with their individual needs (Darling-Hammond et al., 2017; Darling-Hammond & Mclaughlin, 1995; Desimone & Garet, 2015; Wei et al., 2010; Yoon et al., 2007). Accordingly, many teachers view professional development as a compliance exercise rather than a learning experience (Bill & Melinda Gates Foundation, 2014). Moreover,

challenges faced with traditional models are further amplified when designed for technology integration because they tend to focus on software or hardware itself while missing connections to pedagogy and learning theories. Other reported issues include lack of time for in depth training and practice, scarce human or physical resources, not enough sustained support, and limited opportunities for collaboration—all of which are critical to understanding how to integrate new technologies within instruction (Ertmer, 1999, 2005; Ertmer & Ottenbreit-Leftwich, 2010, 2013; Hew & Brush, 2007; Hixon & Buckenmeyer, 2009; Tondeur et al., 2017; Unger & Tracey, 2013).

Numerous studies have investigated effective strategies for professional development and researchers identify several key features for improving the teaching practice: (a) content focus, (b) active learning, (c) coherence, (d) sustained duration, and (e) collective participation (Desimone & Garet, 2015). A recurring recommendation across findings is that professional development be situated in the practice so that teachers can connect learning to the contexts of their classroom (Borko, 2004; Butler et al., 2004; Darling-Hammond & Richardson, 2009; Easton, 2008; Fishman et al., 2014; Lieberman, 1995; Lieberman & Miller, 2008, 2011, 2016). Ultimately, teacher learning should be personalized to meet his or her individual goals through authentic, relevant, and applicable activities. These recommendations support contemporary models of professional development, such as *communities of practice*, *professional learning communities*, *professional learning networks*, *peer-to-peer learning, mentoring, coaching*, or *apprenticeships*, and *informal learning* to encourage knowledge sharing among teachers. Furthermore, many of these models and strategies align with recommendations for supporting teachers with technology integration.

Although contemporary models are now being used more frequently with the aim to develop both technical and pedagogical skills that support teachers' technology integration, there are still inconsistencies with how they are implemented and varying opportunities across schools (Bradshaw, 2002; Ertmer, 2005; Hew & Brush, 2007; Holmes et al., 2002; Mouza, 2002; Polly & Hannafin, 2010; Tondeur et al., 2016; Twining et al., 2013). Additionally, teachers struggle with changing deeply ingrained instructional practices and often use technology in ways that only replace old teacher-centered practices rather than including technology in a thoughtful way that helps students' learning with active learning or constructivist methods. As a result, technology has not lived up to its potential of transforming education (Culp et al., 2003; Hew & Brush, 2007; Twining et al., 2013; Tondeur et al., 2017; U.S. Department of Education, 2016).

In an effort to tackle these challenges, many teachers are turning to their peers and networks for support (Carpenter et al., 2016; Lieberman, 2000; Trust, 2012, 2016; Trust et al., 2016). Those who are comfortable with technology but want new ideas for integrating it within their practices have additionally turned to online spaces. Using the Internet, teachers can find resources such as websites, blogs, wikis, discussion forums, videos, and podcasts. They are also participating in webinars, virtual lectures, MOOCs, micro-credential programs, unconferences, and programs sponsored by technology vendors. In fact, teachers are earning digital badges and prestigious titles in these programs to showcase their technology proficiency with activities situated directly in their classrooms (Beach, 2017; Corcoran & Quattrocchi, 2014; CTQ & Digital Promise, 2016, 2017; Mozilla Alliance for Excellent Education, 2013, 2014; Priest, 2016; Singer, 2017; Trust, 2012, 2016; U.S. Department of Education, 2016).

The following chapter will discuss the methodology for the study, including: the design, sources of data, data collection and analysis procedures, a description of the measures taken to ensure for validity and reliability, and ethical considerations to protect human subjects.

Chapter Three: Methodology

Overview

The purpose of this phenomenological study was to understand the lived experiences of educators who have earned titles (e.g. *Apple Distinguished Educator*, *Google Certified Innovator,* and *Microsoft Innovative Educator Expert*) and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. A phenomenological research design was implemented since all participants shared a common experience of the phenomenon when they applied, acquired a new status, and participated in these technology vendor-sponsored programs (Creswell, 1998, 2014; Moustakas, 1994; Seidman, 2013; van Manen, 1990). Their experiences and status change were then examined with an identity lens (Wenger, 1998). Specifically, this study sought to understand how educators' professional identities changed upon earning prestigious titles from technology vendors for recognition of their skills with technology integration, why they were motivated to acquire new statuses and participate in these programs, what it mean to have such titles, how they are being used within or outside of the teaching practice, and what innovative professional learning methods they experienced as a result of participating in these unique programs.

This chapter presents the methodology of the study as aligned with the research question. It provides the rationale for implementing a qualitative research design with a transcendental phenomenological approach. The role of the researcher is identified with a discussion of measures taken to eliminate potential biases through epoché and a reflexive journal. The chapter describes sources of data collected, which include interview videos, transcripts, field notes, and artifacts shared by participants. It also discusses the purposive sampling strategy used to recruit participants who met the study criteria and the methods for obtaining consent. Additionally, there

is a detailed explanation of how the data was collected and analyzed with the means to ensure for validity and reliability. The chapter concludes with a delineation of ethical considerations and addresses how human subjects were protected according to the Institutional Review Board (IRB) standards.

Restatement of the Research Question

This investigation was guided by the following research central research question: *What are the lived experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?*

Qualitative Research Design

Qualitative research is contextual and situated in a natural setting where the researcher explores data through thick descriptions, analysis, and observation of social behaviors (Bogdan & Bilken, 2007; Creswell, 1998, 2014; Gray, 2013; Hoepfl, 1997; Patton, 2015; Roberts, 2010; Silverman, 2005). Strauss and Corbin (1990) claim that "qualitative methods can be used to better understand any phenomenon about which little is yet known, to gain new perspectives on things about which much is already known, or to gain more in-depth information that may be difficult to convey quantitatively" (as cited in Hopefl, 1997, p. 48). Through a qualitative data collection process, the researcher does not rely on instruments or questionnaires developed by other researchers, and instead becomes a key instrument while conducting observations or interviews focused on participants' perspectives (Bogdan & Bilken, 2007; Creswell, 2014; Hoepfl, 1997; Roberts, 2010; Seidman, 2013). In this naturalistic approach, the researcher compiles in-depth experiential information then attempts to "make sense of or interpret phenomena in terms of the meanings people bring to them" (Creswell, 1998, p. 15).

Rationale for a Phenomenological Study

Phenomenology describes the meaning of experiences lived by several individuals and seeks to understand the essence of those experiences from the point of view of the participants (Creswell, 1998; Hatch, 2002; Hoepfl, 1997; Moustakas, 1994; Seidman, 2013; van Manen, 1990). This qualitative study followed a phenomenological research design by collecting information from a group of people living through a shared experience or phenomenon in order to provide a deeper understanding from those who were directly involved (Creswell, 1998, 2014; Gray, 2013; Richards & Morse, 2012; Seidman, 2013; van Manen, 1990). The phenomenon that was examined is the acquisition of status and educators' dedicated participation in programs sponsored by technology vendors, specifically exploring how their professional identities changed upon earning prestigious titles for recognition of their skills with technology integration. A phenomenological methodology allowed the researcher to better understand the views of educators who have earned such titles and participated in these programs by combining multiple voices to tell the story of their lived experiences through in-depth interviews and the collection of artifacts (Creswell, 1998, 2014; Moustakas, 1994; Patton, 2015; Seidman, 2013; van Manen, 1990).

Transcendental phenomenology. Phenomenological research can be conducted through two approaches: hermeneutic phenomenology (van Manen, 1990), which concentrates on the researcher's interpretation of participants' lived experiences or transcendental phenomenology (Moustakas, 1994), which focuses more on the actual experiences of the participants and less on the interpretations of the researcher. In a transcendental approach, "everything is perceived freshly, as if for the first time" (Moustakas, 1994, p. 34). This study used a transcendental phenomenology approach to describe the lived experiences of all participants by reducing

individual experiences to a collective story (Creswell, 1998; Moustakas, 1994). As Creswell (1998) discusses, "the basic purpose of phenomenology is to reduce individual experiences with a phenomenon to a description of the universal essence...this description consists of 'what' they experienced and 'how' they experienced it" (p. 58). Therefore, the researcher did not impose any predetermined assumptions and instead described the phenomenon using participants' actual voices and experiences as they lived them (Creswell, 1998; Moustakas, 1994).

Role of the Researcher

The researchers' interest in this topic grew from observing how many large technology vendors have educational programs focused on teacher professional learning and from curiosity about their impact. As the dissertation began to take form, it became apparent that the interest was actually in the more general phenomenon of what motivates teachers to pursue programs on their own that help them to gain skills, earn recognition for their achievements, and how this influences their teaching and mentoring practices with regard to technology integration. Since the researcher previously worked as a K-6 multiple-subject (elementary education) teacher, a school technology coordinator, an adjunct faculty member of educational technology courses, and earned achievements such as digital badges and titles in programs sponsored by technology vendors, it was recognized that this may bring a level of bias into the study. To account for this, the study followed a transcendental phenomenology approach (Moustakas, 1994) by identifying the phenomenon under investigation, bracketing the researcher's experiences, and collecting data directly from those who lived through the experience.

Richards & Morse (2012) explain, "when thinking phenomenologically, the researcher attempts to understand, or grasp the essence of how people attend to the world, remembering that a person's description is a perception, a form of interpretation" (p. 69). Therefore, researchers

must remove their own biases while interpreting others' experiences of a particular social reality, so new meaning can emerge (Conklin, 2007; Hammersley, 1987; Gray, 2013; Seidman, 2013; Silverman, 2005). The researcher took additional measures to account for this by setting aside any judgments through epoché or bracketing personal experiences in order to openly investigate participants' attitudes, beliefs, and reflections through their individual accounts and perspectives (Creswell, 2014; Gray, 2013; Moustakas, 1994). Bracketing allowed the phenomena to 'speak for itself' without being prejudiced by the researchers' preconceptions (Gray, 2013; Moustakas, 1994).

The researcher's reflexive journal. As a strategy for epoché, the researcher used a reflexive journal (Lincoln & Guba, 1994; Moustakas, 1994) to reflect on how her personal background, culture, experiences, and role in the study influenced interpretations (Creswell, 2014; Richards & Morse, 2012). Lincoln and Guba (1994) advise that the journaling process include: (a) "a daily schedule describing the logistics of the study; (b) a log of methodological decisions and changes; and (c) a personal diary recording reflections with particular reference to one's values and interests" (p. 210). The researcher followed this recommendation by reporting perspectives, values, and beliefs before and after data collection. This process helped the researcher to identify any preconceptions that might sway objectivity while considering the study holistically and making meaningful connections between theory and practice (Gray, 2013; Richards & Morse, 2012).

Sources of Data

The primary source of data for this study was semi-structured interviews that were virtually recorded and transcribed into narrative text (Creswell, 1998, 2014; Patton, 2015; Seidman, 2013). While conducting interviews, the researcher also took field notes to document

observations made such as nonverbal cues and changes in voice intonation, which would not be noticeable in the written transcriptions (Patton, 2015). This reminded the researcher to intentionally revisit specific sections of the recorded interviews for a deeper understanding of participants' responses. Additionally, the researcher collected artifacts that were shared as authentic examples of educators' experiences, which included their application presentation, video, or related projects they have worked on since earning their titles and participating in the programs. The researcher was then able to use some of the artifacts shared to triangulate what was discussed in the interviews. Additionally, the researcher conducted a member check with each participant following analysis in order to ensure for accuracy (Creswell, 2014; Gray, 2013; Richards & Morse, 2012).

Sampling Strategy

Phenomenology requires collecting narratives from participants who have a significant experience of the phenomenon (Creswell, 1998, 2014; Hatch, 2002; Moustakas, 1994; van Manen, 1990). A purposeful sampling strategy allowed for the intentional selection of educators who would provide further insight into the phenomenon under investigation, which was the change in identity as a result of new status acquired and dedicated participation in these programs (Creswell, 1998, 2014; Seidman, 2013; Silverman, 2005). The researcher's goal was to speak with educators who earned a prestigious title and participated in at least one of these professional development programs for a detailed understanding of their experience.

The criteria for purposeful sampling in this study was that the six participants were: classroom teachers with a K-6 multiple subject (elementary education) teaching credential, at least three to five years of teaching experience, and who have recently earned a prestigious title (e.g. *Apple Distinguished Educator, Google Certified Innovator,* and *Microsoft Innovative*

Educator Expert) from vendor-sponsored professional development programs in the past three years so they could easily recall their experiences. The researcher selected classroom teachers who have a K-6 multiple subject (elementary education) teaching credential to narrow the sample size and focus on the elementary level of schooling, when technology is first being introduced to students in an educational setting. Additionally, the researcher acknowledged her belief from prior experience as a K-6 teacher that there may be more opportunities to integrate technology when teaching multiple subjects. For the purpose of this study, the researcher did not include technology coaches or TOSAs (Teachers on Special Assignment) and instead explored the phenomena of classroom teachers who have applied to these highly competitive programs through an application process and were selected to participate while continuing to teach full time.

Data Collection Procedures

According to Moustakas (1994), "evidence in phenomenological research is derived from first-person reports of lived experiences" (p. 84). Although there are many data collection methods that can be applied to phenomenological research, interviews are often used to gain understanding of a personal and lived experience (Creswell, 1998; van Manen, 1990). Therefore, data was collected through semi-structured interviews and also included artifact analysis for triangulation (Creswell, 2014; Gray, 2013; Richards & Morse, 2012).

Participant Recruitment and Consent

Prior to conducting interviews, the researcher recruited participants meeting the study criteria and obtained consent. As part of the recruitment process, a personalized introductory letter was developed to explain the study goals, participant requirements, incentive to participate, and information about how to sign up via a hyperlink (see Appendix C). It also explained that the

interviews would be conducted and recorded via the Zoom video-conferencing application. The letter was then shared on social media platforms including LinkedIn, Twitter, and Facebook. The researcher also contacted members of these technology vendor-sponsored programs for recruitment assistance, although interviewees were purposefully selected based on specific criteria (Conklin, 2007; Creswell, 1998, 2014; Gerber, Abrams, Curwood, & Magnifico, 2016; Gray, 2013; Hatch, 2002; Hoepfl, 1997; Patton, 2015; Richards & Morse, 2012; Seidman, 2013; Silverman, 2005). To encourage participation, educators who agreed to be interviewed were given a $25.00 Amazon gift card as incentive for their participation.

Interested participants were directed to give consent by signing up via the hyperlink, which connected to a private Google form, where they provided their name and contact information to schedule the interview (see Appendix D). This form also asked participants to confirm if they: (a) have a multiple subject (elementary education) teaching credential, (b) have at least three years of teaching experience, (c) currently teach in a K-6 classroom, (d) have earned prestigious title(s) from one of the technology vendor-sponsored programs, and (e) to specifically name which title(s) were earned. Additionally, the form clearly stated that participants' names and contact information would remain private and would not be included in the study results. Once participants agreed to join the study, the researcher confirmed that they met the specific criteria and made arrangements to conduct video-conference interviews. A written consent form was emailed to participants (see Appendix E) along with an interview topic guide (see Appendix F) containing a list of potential subject matter that may be discussed such as: professional development focused on technology integration, participants' attitudes, beliefs and motivation for participating in the technology vendor-sponsored programs, their experiences in these programs including interactions with other educators, and recommendations of

innovative strategies for professional learning based on their experiences.

As recommended by Seidman (2013), the researcher developed a database of participants to "facilitate communication, confirm appointments, and to follow up after interviews" (p. 53). The researcher selected two teachers who earned these competitive titles from each technology vendor-sponsored program (e.g., Apple, Google, and Microsoft) to ensure that they were proportionally represented. This also allowed the researcher to hear multiple perspectives in order to better understand their lived experiences and how they related or differed.

Participant Descriptions

The background of each K-6 teacher participant in this study is discussed below (see Table 1 for an overview).

Table 1.

Participant Context Information

#	Pseudonym	Title(s)	Position	Location in U.S.
P1	Keiko	*Apple Distinguished Educator*	First Grade Teacher	Midwest region
P2	Jennifer	*Apple Distinguished Educator;* *Google Certified Innovator*	STEM Teacher (K-4)	Northeast region
P3	Angela	*Apple Distinguished Educator;* *Google Certified Innovator*	Fourth Grade English Language Arts Teacher	Midwest region
P4	Jared	*Google Certified Innovator*	Kindergarten Teacher	Southwest region
P5	Sarah	*Microsoft Innovative Educator Expert*	Sixth Grade Computer Science Teacher	Northwest region
P6	Michelle	*Microsoft Innovative Educator Expert*	Technology Teacher (K-6)	Southeast region

Participant 1: Keiko, Apple Distinguished Educator. Keiko is originally from Japan and she moved to the United States in the late 1990's. She currently lives in the Midwest region of the United States. She has a Bachelor's degree in Elementary Education with an Early Childhood endorsement and a Master's degree in Education with a Reading endorsement. She has been teaching in the elementary school level for over seventeen years, twelve of which have been in first grade (where she is currently), and five in kindergarten. Keiko is a model teacher, so she frequently opens her classroom for other teachers within her school and district to visit and observe her.

Participant 2: Jennifer, Apple Distinguished Educator and Google Certified Innovator. Jennifer has a Bachelor's degree in Elementary Education, a Master's degree in Curriculum and Instruction, and an Educational Technology Graduate Certificate. She has worked in education for over fifteen years. She taught kindergarten, fourth, and fifth grade during for her first five years and moved into a technology-coaching role to support other teachers for ten years. Titles of her roles have included: Library/Media Specialist, Technology Integration Coach, Digital Learning Leader, and Technology Integration Specialist. She's worked in the United Kingdom, Dubai, and the Northeast region of the United States. Jennifer helped her schools to integrate the Google Apps for Education suite when it was new and she launched a 1:1 iPad initiative when Apple introduced them in 2010.

More recently, Jennifer decided to not coach and for the 2018-2019 school year was hired to launch a "STEM Maker Design Studio Space" in an elementary school with pre-kindergarten through 4th grade students. She is treated as a resource/specialist teacher for Art, Music, or PE, where students from each grade level rotate into her classroom once per week. She co-teaches with all of the classroom teachers in Science and Math on a weekly basis.

Participant 3: Angela, Apple Distinguished Educator and Google Certified Innovator. Angela has a Master's degree in Elementary Education and is a Certified Reading Specialist for grades K-12. She has consistently taught fourth grade English Language Arts for thirteen years and has been nationally recognized for creating engaging and comprehensive iTunes U courses aligned to the Common Core in this area. She was responsible for leading her school in a 1:1 iPad initiative in 2010 when they first came out and she helped the school get recognition as an "Apple Distinguished School." Angela has also provided professional development, modeling, and support for teachers in her school, district, and state, while receiving prestigious awards such as "Technology Educator of the Year."

Participant 4: Jared, Google Certified Innovator and Google Certified Trainer. Jared has a Bachelor's degree in Elementary Education and Teaching in addition to a Master's degree in Teaching English to Speakers of Other Languages (TESOL). He has been in education for twelve years in the same school district in the Southwest region of the United States. He taught sixth grade for six years, worked as an onsite Instructional Coach to support K-6 teachers for one year, and was an Educational Technology TOSA for the district. In the 2018-2019 school year, Jared decided he wanted to return to the classroom as a kindergarten teacher. He missed working directly with students and wanted to explore technology integration with a young age group. Jared describes himself as "lifelong newbie," since he strongly believes "there is always something to learn."

Participant 5: Sarah, Microsoft Innovative Educator Expert and Minecraft Global Mentor. Sarah has a Bachelor's degree in Elementary Education and four years of teaching experience at a private Christian school in the Northwest region of the United States. During her first year of teaching, she taught third grade and following this, she taught sixth through tenth

grade. Sarah currently teaches Computer Science for sixth through eighth grade in addition to sixth grade homeroom. Sarah's primary role is to teach all subjects through interdisciplinary projects in a more flexible setting than traditional schools. Her school's mission focuses on Project Based Learning (PBL) and STEM-based learning with an emphasis in technology integration. The school is considered a "Microsoft Showcase School" and all teachers are required to become *Microsoft Innovative Educators*, although only a handful have pursued the "Expert" level as a MIEE. She is extremely active in the *Minecraft Global Mentor* community and models ways to incorporate Computer Science skills Minecraft. Sarah is passionate about learning and has earned 60 badges in the Microsoft community. She also wants to earn a graduate certificate in "Human Centered Design Engineering" and to eventually complete the full Master's degree program in this area.

Participant 6: Michelle, Microsoft Innovative Educator Expert. Michelle has a Bachelor's degree in Early Childhood Education and Teaching in addition to a Master's degree in Reading Teacher Education. She lives in the Southeast region of the United States and has been in education for over twenty years. She started her career as a first grade teacher and later taught second grade, fourth grade, and in the gifted program. She has also worked as a Media Specialist and was recently hired in the 2017-2018 school year as a Technology Teacher in a STEM school to help set up a 1:1 iPad lab for students. Her class is considered part of the "special subjects rotation" that includes Science, Art, Music, and Physical Education. In her role, she supports 1,200 students across grades K-6. She is additionally head of the school technology committee and provides professional development opportunities for teachers onsite.

Interview Protocol

In preparation for semi-structured interviews, the researcher developed a protocol to

ensure for consistency while establishing norms, outlining the study goals for participants, and reviewing the anticipated process (see Appendix F). This protocol also reminded the researcher to ask for verbal consent from participants before recording the interviews and to state that they could decide to opt out of the study at any point. Since the purpose of phenomenological research is to capture a first-person description of lived experiences, the protocol included several open-ended prompts to address the research question and phenomena of interest (Creswell, 1998; Gerber et al., 2016; Patton, 2015; Seidman, 2013; Silverman, 2005). Interview questions were intentionally open-ended rather than scripted so they would elicit participants' candid recollections, gather details, and foster concrete connections to their lived experiences (Patton, 2015; Seidman, 2013; van Manen, 1990). To maintain a natural conversational flow, the researcher occasionally moved through the protocol out of order so that prompting aligned with participants' accounts. The researcher additionally posed follow-up questions as needed to fully capture participants' experiences. Furthermore, the final protocol question asked if there was anything else that participants wanted to share on the topic before the interview concluded. The protocol was also tested with the researchers' dissertation chair, a member of the dissertation committee, and later used in a pilot interview to ensure validity and reliability before being implemented in the study.

Semi-Structured Interview Process

Interviews were conducted between November 2018 and January 2019 via the Zoom video-conferencing application. Zoom video was utilized so that the researcher could observe participants' facial expressions and build rapport while connecting with them across geographic boundaries in order to better understand their lived experiences. Seidman (2013) explains, how "the job of an in-depth interviewer is to go to such depth in the interviews that surface

considerations of representativeness and generalizability are replaced by compelling evocation of an individual's experience" (p. 55). Depending on participant responses, the interviewer occasionally explored particular themes further by asking probing questions that were related to the question, but not included in the interview protocol (Creswell, 1998; 2014; Gray, 2013; Richards & Morse, 2012; Seidman, 2013). Seidman (2013) advises that interviewers must listen on three levels: (a) to what the participant is saying, (b) to the "inner voice" of what the participant means openly or unguarded by what the public thinks, and (c) to intonation while observing nonverbal cues (p. 81-82). This reiterates why the researcher took field notes during each interview to ensure other cues were recorded so that they could later be connected with the videos and transcripts. Field notes also allowed the researcher to concentrate on what the participant was saying while keeping track of any topics that needed to be revisited during the interview (Creswell, 2014; Seidman, 2013).

At the start of each interview, the researcher reviewed the consent form and asked for verbal consent before proceeding with recording. Interviews lasted 50 minutes on average and participants followed up by emailing artifacts to the researcher. At the completion of each interview, recorded sessions were securely transcribed by the Zoom video-conferencing application and later analyzed for repeating themes. Recorded interviews, narrative transcriptions, and artifacts shared were stored on a password-protected and encrypted device that was only accessible to the researcher.

Artifact Collection Process

Participants shared varying numbers of artifacts including their application videos, presentations, or examples of projects they have worked on since participating in the technology vendor-sponsored programs. These artifacts were reviewed and described in the researchers'

field notes. Application videos and presentations allowed the researcher to see how participants' professional identities were portrayed prior to their selection into the programs based on the skills and practices they decided to highlight. This was then compared with their recollections in order to triangulate the data and better understand their experiences as possible (Creswell, 2014; Gray, 2013; Richards & Morse, 2012).

Data Analysis Procedures

According to Seidman (2013), "it is difficult to separate the processes of gathering and analyzing data," especially in between interviews. He discusses the advantages of integrating both stages so that "each informs the other," although he advises that an in-depth analysis should be performed after all interviews have been completed in order to "avoid imposing meaning from one participant's responses to the next" (p. 116). The researcher heeded to this advice so that the data was not contaminated while also following Moustakas' (1994) recommended stages for phenomenological data analysis: (a) epoché, (b) phenomenological reduction, (c) imaginative variation, and (d) synthesis (p. 90-100).

In the first stage, the researcher engaged in *epoché* by bracketing her own experiences associated with the phenomena to better understand the participants' experiences without imposing judgment or bias. This was done through the use of a reflexive journal, which was utilized throughout the entire data analysis process. Next, the researcher went through *phenomenological reduction* by reviewing the interview transcripts and reducing them to significant quotes. This allowed the researcher to eliminate any overlapping, repetitive, or vague statements that would not need to be included. Once data was transferred into units of meaning and themes, the researcher provided a textual expression to illustrate what participants individually experienced and a structural description of how they experienced it. Following

reduction, the researcher conducted the *imaginative variation* stage by combining individual interpretations and examining the data across participants. This led to the creation of a textual and structural description that included all participants' perspectives. Finally, the researcher described the essence of the phenomenon in the *synthesis* stage (Creswell, 1998; Moustakas, 1994).

Coding Process

The researcher followed an inductive and deductive coding process (Fereday & Muir-Cochrane, 2006). First, significant quotes were analyzed and compiled into emergent themes. Next, the researcher organized the emergent themes within the theoretical framework, Wenger's (1998) five dimensions of identity using the following categories: (a) *Identity as the negotiated experience of self,* (b) *Community membership*, (c) *Identity as a learning trajectory,* (d) *Identity as a nexus of multi-membership,* and (e) *Identity as a relation between local and global contexts* (see Table 2). Since some themes did not fit into Wenger's five dimensions of identity and instead related to innovative professional learning methods that were found in the programs, the researcher organized them into two categories (a) *learning continues through online collaboration, in-person meet-ups, or alumni events* and (b) *participants have direct interaction with technology vendors' product developers and opportunities to pilot new products*.

In an effort to work efficiently and reliably, all qualitative data were compiled and coded using the HyperRESEARCH computer software to organize themes presented in the study (see Appendix J for codebook organization and example quotes from interviews). This software allowed the researcher to create a codebook filter through results, conduct queries, and build reports that were helpful when analyzing the data. The codebook was additionally cross-checked by a peer-reviewer to ensure that themes were consistently aligned with the data (Conklin, 2007;

Corbin & Strauss, 2015; Creswell, 2014; Gray, 2013; Moustakas, 1994; Patton, 2015; Richards & Morse, 2012; Seidman, 2013, Silverman, 2005; van Manen, 1990).

Table 2.

Coding Organization Summary

Wenger's (1998) Five Dimensions of Identity	Emergent Themes
1) *Identity as the negotiated experience of self:* Defining what the earned titles mean	Encouraged by others to apply; Competitive; Self-Starter; Showcasing skills; Recognition; Inspired to deploy new technologies
2) *Community membership:* Connecting with other educators	Sharing ideas; Project collaboration; Establishing relationships; Community building; Forming PLNs; Twitter/Social Media
3) *Identity as a learning trajectory:* Applying new skills learned within and outside of the classroom	Higher education; Growth mindset; Early adopters; Mentoring/Coaching; Consultant work; Presenting at conferences, Developing curriculum or other resources
4) *Identity as a nexus of multi-membership:* Comparing identities as educators in schools and participants in the programs	Isolation in school; Others not recognizing titles; Participating in more than one vendor program Accountability; Tensions
5) *Identity as a relation between local and global contexts:* How educators define themselves through their participation and what they see as meaningful	Student-Centered; Giving students choices w/ technology tools; Inspired by other educators; Champion

(continued)

Innovative Methods for Professional Learning	Emergent Themes

(1) *Learning continues through online collaboration, in-person meet-ups, and alumni events*	Learning continues; Online collaboration; Meet-ups; Alumni events
(2) *Direct interaction with technology vendors' product developers and opportunities to pilot new products*	Interaction with developers; Learning about new releases; Beta-testing
(3) Sub-Themes	Intimate conference; Funding opportunities

Means to Ensure Study Validity and Reliability

Hammersley (1987, 1992) is frequently cited on the subject of validity. He states that, "a research account may be considered valid if it represents accurately those features of the phenomena that it is intended to describe, explain, or theorize" (Hammersley, 1992, p. 67). Likewise, Silverman (2005) states that validity "is another word for truth" (p. 224). He proposes five strategies for increasing the validity of findings: (a) "engaging in the *refuting principle* by refuting assumptions against data as the researcher proceeds through the research, (b) using the *constant comparative method* by comparing one case against another, (c) doing *comprehensive data treatment* by incorporating all cases into the analysis, (d) searching for *deviant cases* by including and discussing cases that don't fit the pattern, and (e) *making appropriate tabulations* by using quantitative figures when these make senses as in mixed-method designs" (p. 209-226). The researcher followed these recommendations as applicable while using reflexivity and triangulation to increase accuracy across themes explored (Creswell, 2014; Gray, 2013; Moustakas, 1994; Richards & Morse, 2012). Methods for triangulation included comparing participants' discussions with artifacts shared to better understand their experiences, especially when reviewing their initial application videos or presentations to observe how their identities have changed from before and after participation in the programs (as possible, but not all

participants provided the same artifacts). Furthermore, the interview protocol was developed in alignment with the study's phenomenological design and the research question. The dissertation chair also validated that questions were clearly stated and free of biases.

In addition to considering validity, the researcher took measures to ensure for reliability. According to Silverman (2005), "reliability refers to the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions" (p. 400). The goal of reliability is to "minimize both errors and bias in a study" so that findings are dependable (Corbin & Strauss, 2015; Creswell, 2014; Hammersley, 1987; Lincoln & Guba, 1994; Richards & Morse, 2012; Silverman, 2005). As a strategy for reliability, the researcher tested the interview protocol with the dissertation chair and a member of the dissertation committee to determine if modifications were necessary. A pilot interview was also conducted with an educator who met the study criteria. This allowed the researcher to practice with the data collection and analysis process. Following the pilot interview, findings were shared with the researchers' dissertation chair to ensure that all preconceptions were appropriately bracketed throughout each stage and that procedures were carried out in a consistent manner. This process also helped the researcher to determine that the protocol did not need to be revised.

Next, official interviews were conducted, recorded, and transcribed using the Zoom video-conferencing application. Transcriptions were then imported within HyperRESEARCH, trusted software for qualitative data analysis so that a codebook could be developed with fidelity. HyperRESEARCH allowed the researcher to sort and organize codes with the interview transcript data and assign them to one or more themes. Additionally, the researcher exercised accuracy in reporting findings by allowing member checking as a strategy to ensure for validity and reliability

(Creswell, 2014; Gerber et al., 2016; Gray, 2013; Paulus, Lester, & Dempster, 2013; Richards & Morse, 2012).

Protection of Human Subjects and Ethical Considerations (IRB)

Digital tools of the twenty first century continue to transform traditional research methods, offering increased flexibility in design and implementation across online spaces (Gerber et al., 2016; Gothberg, Applegate, Reeves, Kohler, Thurston, & Peterson, 2013; Paulus, Lester, & Dempster, 2013). While these tools bring many advantages, researchers must be aware of ethical, confidential, and legal concerns regarding participant privacy when corresponding with participants online via public social media platforms, conducting virtual interviews that will be recorded, and obtaining permissions for collecting digital artifacts (Gerber et al., 2016; Gray, 2013; Morse & Richards, 2012; Paulus et al., 2013). Paulus and colleagues (2013) discuss primary values to consider including "minimizing harm to participants, respecting and acknowledging the rights of participants to decide whether to participate or withdraw from a study; and protecting the identity of participants and/or community within which you engage in research" (p. 23). Researchers should avoid putting their subjects at risk and must require informed consent for involvement within their studies (Creswell, 1998, 2014; Corbin & Strauss, 2015; Gray, 2013; Hatch, 2002; Patton, 2015; Richards & Morse, 2012; Silverman, 2005). Ultimately, it remains up to the researcher to protect participants by exercising accuracy in reporting findings, by debriefing with participants about how their statements will be used, and by allowing member checking as a validation strategy (Gerber et al., 2016; Paulus et al., 2013).

As Paulus et al. (2013) remind us, "ethics should be seen as an ongoing process of reflection, analysis, and action" (p. 24). To ensure that this study met ethical and professional standards while protecting the welfare of human subjects, an application was submitted to the

Pepperdine University Institutional Review Board (IRB). Approval was obtained in September 2018 and the study qualified as exempt since it involved no more than minimal risk to subjects, participation was completely voluntary, and minors were not included (see Appendix I). With consent, subjects participated in virtual interviews that were recorded, securely transcribed, and stored on the researchers' password and network protected computer. Subjects were also informed that they could opt out of the interviews at any point and request that their data not be included in the study.

All subjects' privacy was fully protected and they were assured that there would not be any unique information to identify them. The researcher implemented elements of confidentiality and anonymity by concealing the names of specific people, places, or institutions. All data collected including recorded interviews, transcripts, field notes, and artifacts were assigned an identification number so they would not be traced to actual subjects. Artifacts shared such as application videos or presentations and examples of related projects were only described in general terms as they related to the subjects' interview responses and direct links were not published. Furthermore, the final write up did not include names or identifying characteristics and all participants were given a pseudonym for data analysis and reporting purposes.

Chapter Summary

Chapter three presented the research methodology for this study on the lived experiences of educators who have earned titles and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. A phenomenological design was implemented using a transcendental phenomenological approach by focusing on the actual experiences of the participants rather than on the interpretations of the researcher. While searching for the essence of the phenomenon being investigated, data was

collected and analyzed through semi-structured interviews with six educators who met the study criteria. The researcher also reviewed artifacts shared by participants to triangulate the data. This chapter additionally discussed details of data analysis (Moustakas, 1994), the measures taken to ensure internal validity and reliability (e.g., use of a reflexive journal, pilot testing, member-checking, and use of HyperRESEARCH). Moreover, ethical considerations and efforts to protect human subjects for IRB were addressed. The study results are presented in the following chapter.

Chapter Four: Results

Chapter four presents the findings of this phenomenological study on the lived experiences of educators who have earned titles (e.g. *Apple Distinguished Educator, Google Certified Innovator,* and *Microsoft Innovative Educator Expert)* and participated in vendor-sponsored professional development programs. The researcher used semi-structured interviews with six participants (two educators from each program) in the data collection process to address the research question. After interviews were conducted and analyzed, each participant was given a pseudonym to protect their individual identity.

In order to better understand the phenomenon being explored, findings are presented in a narrative format that includes data excerpts from the participants to offer further insight into their experiences. The researcher strived to translate findings into a storyline that "closely approximates the reality it represents" (Strauss & Corbin, 1990, p. 57). As Richards and Morse (2012) reinforce, thick descriptions tied with analytic pieces are "the medium in which the actual descriptions of contexts, phenomena, actions, transitions, procedures, and processes are explained, described, explored, revealed, unraveled, compared or contrasted, and linked to other components" (p. 233). This narrative contains a detailed description of key themes generated from the data, which include professional identity and innovative methods for professional learning. Relevant artifacts shared by participants are also discussed.

Restatement of the Research Question

This investigation was guided by the following research central research question: *What are the lived experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?*

Core Themes

A transcendental phenomenological reduction process resulted in the identification of two core themes generated from the data, which include professional identity and innovative methods for professional learning. Wenger's five dimensions of identity were used as a framework for organizing the professional identity themes into the following categories: (a) *Identity as the negotiated experience of self:* Defining what the earned titles mean, (b) *Community membership:* Connecting with other educators, (c) *Identity as a learning trajectory:* Applying new skills learned within and outside of the classroom, (d) *Identity as a nexus of multi-membership:* Comparing identities as educators in schools and participants in the programs, (e) *Identity as a relation between local and global contexts:* How educators define themselves through their participation and what they see as meaningful. The researcher acknowledges that there may be overlap in these dimensions and some of participants' responses easily fit into multiple categories. Additionally, innovative methods for professional learning were organized into the following categories: (a) *learning continues through online collaboration, in-person meetups, or alumni events* and (b) *participants have direct interaction with technology vendors' product developers and opportunities to pilot new products*. There were also two sub-themes that came up among several but not all participants, which include: (a) *intimate conference* and (b) *funding opportunities*. The significance of these themes and sub-themes will be discussed in further details below.

Professional identity. As explained in the literature review, Wenger (1998) describes how identity connects closely with practice and depicts five dimensions of identity: (a) identity is the *negotiated experience* of self (how we define ourselves through participation and how others define us), (b) identity involves community membership (how we are defined by the familiar and

unfamiliar), (c) identity has a *learning trajectory* (how we define who were are by where we have been and where we are going), (d) identity has a *nexus of multi-membership* (how we bring multiple forms of identity into one), and (e) identity is a *relation between local and global contexts* or how we define ourselves through experiences and how meaning is attributed to those experiences (p. 149). These dimensions correspond directly with the core themes presented throughout the interview data collected and therefore were used as a framework for understanding educators' experiences.

Theme 1- Identity as the negotiated experience of self: defining what the earned titles mean. According to Wenger (1998), "identity is becoming" and this "work is ongoing and pervasive" (p. 162).

Keiko (P1). Keiko reflects on what she thinks it means to be an *Apple Distinguished Educator* stating, "so, technology wise, they (referring to ADEs) are just smart people. They know how the technology works. They know the latest updates or tools and they're great go to people." She mentions being inspired by other educators that she met online via Twitter, who she also refers to as "leading people," to submit an application for the ADE program:

> I met a few educators through Twitter and they just really inspired me and they got me going with technology innovation in the classroom and also kind of gave me a little bit of a better vision as an educator...where I wanted to be or go. I had been teaching for about 10 years and I was starting to question this because up until then, it was kind of like whatever was there or was given were the things that I was trying...Then my school started using more technology. So I started looking on Twitter and met these amazing people...I was grateful for them. They were leading people so I understood why they were chosen. I got really close with one particular person and she was the one actually who encouraged me to apply.

Keiko explains how she submitted an application to join the *ADE* Class of 2015, but she did not get accepted to participate. She describes her reaction:

> First, I was like, "well, I'm not quite there yet," which shows because I really wasn't sure what to showcase in the application process. I wasn't going to apply

> again. I just didn't want to fail of course, but I thought, "maybe give it one more try." In 2017, I really knew how to put myself out there and I figured if they didn't like it, then "so-be it..." I'm glad I applied one more time because I was accepted on the second attempt. The first time I applied, the advice I was getting was, "it's for Apple, so you have to really sell the Apple products and how you are using them well in the classroom." I'm actually not all about just products. It's more about the students' learning and how we can help their learning go to the next level with technology. So, I think I really showcased that it wasn't just about Apple, but how I give students more tools to demonstrate their learning. I also use coding quite a bit in the classroom so that was in the application video as well.

Keiko felt honored when her second application was accepted and she discusses growing professionally throughout the entire process. She was very excited for the opportunity to fulfill her role as an *ADE* and continue learning from other inspiring educators.

Jennifer (P2). Jennifer was first introduced to the Google Apps for Education Suite when she was a technology coach abroad and she "really fell in love with that tool from a workflow perspective in the classroom supporting teachers." So at this point, she "investigated and started to connect with other schools that were also launching G Suite back in 2010." She then learned about the *Google Teacher Academy* (title of the program before it later became referred to as *Google Innovator Academy*) and was encouraged to apply. She describes how a colleague told her this would be a great way for her to "meet new people at other international schools across Europe and India" in addition to being helpful for sharing ideas.

Jennifer researched the program further and learned that the next academy would be held in London. She was excited for the opportunity and decided to apply. She further explains, "I was really looking forward to just expanding my professional learning network there to meet up with other educators like myself who were using the tools in unique and innovative ways." For her Google application, Jennifer created a video about her use of technology as a classroom computer teacher and coach, since her position consisted of both roles. She was accepted into the *Google Teacher Academy,* which included spending four days in London.

Jennifer also worked in a K-12 school that was using older MacBooks and Netbooks, but they were having numerous issues. As a result, teachers were interested in adopting iPads school-wide and she helped to pilot a 1:1 initiative. Jennifer says she "really saw the power in it." She describes how another colleague from Silicon Valley, California encouraged her to apply for the *Apple Distinguished Educator* designation. Upon further research, she thought to herself, "Wow, this is super competitive. I'm never going to get that." Despite her initial hesitation, she later convinced herself:

> Well, I did the Google thing and I'm really interested to see what this is about, because we are going to be getting a lot of iPads and I'm sure if I were to get in, there'll be a lot of great resources and people I can meet that have gone and deployed these in their schools and implemented them.

For her ADE application, Jennifer created a video about her school's issues with deploying netbooks and how teachers weren't happy with them. In the video, she discusses how they were in the process of replacing the netbooks with iPads and she gives examples of how students were using them for content creation. When Jennifer found out she was accepted, she describes her disbelief:

> So immediately I was shocked that I got in and I did hear...I mean it's probably true as well I think, that if you're applying outside of the United States— even though you are American, I think it's like a little bit easier to get in. I think they want people that have a little bit more of a global perspective, especially at that time because the iPad was so young and there weren't a lot of schools that were taking that leap in the U.S. as well to the extent that we were for the number shear number of iPads that we were deploying and then how our implementation was really successful. So we had a lot of amazing data that we collected from student work.

Jennifer discusses how she thinks the earned titles can be used to showcase what technology products teachers are integrating in their classrooms and what makes sense to them. She explains how they are a way to say, "here's what I'm about and here's what I'm practicing on a daily basis... I'm educating children today with these tools." Additionally, she mentions how

sometimes school districts, technology directors, or administrators may decide what products or tools a teacher should be using, but this is another way for them to demonstrate what they believe in terms of instructional practice. She also discusses how the titles can be used to help teachers identify others who may be "experts with a particular product" in addition to having more respect for them. Jennifer elaborates on what the title means to her:

> I personally don't try to use it to be like, "I'm so much better than you." I always feel like it's a way to connect with people, share ideas, and show people, "Well, here's how I'm using this product and maybe this will help you," which sets a really good tone in education. I don't think any of these designations, whether they're Google, Apple or Microsoft... I don't think the point is to say one is better than the other. I think it's just to say, "I'm using this, I'm having success, and here's how my students are using it… These are some of the outcomes and you might consider trying this."

Angela (P3). Angela was one of the first teachers in her school and district to pilot a 1:1 iPad initiative. She describes how her participation in the Apple community began when she was pursuing support with this endeavor:

> I actually didn't do it to get recognized, I did it more to help us as a school district. Let's see, 2010 was when the iPad came out and 4 of the teachers here including myself wrote a grant to get iPads in our classroom. We only started with 10 and we really didn't know much about them.

Angela explains how she was initially trying to convince her principal to get Kindles for the students, but then he informed her about the iPad that had just come out and once she had a set of 10, she realized that "this could be really a game changer in education." Angela discusses how her school was able to increase the number of iPads being deployed and how she found support from others online during this time:

> I started teaching with iPads, hit the ground running, and I was just blown away. This was probably like my fifth year of teaching and I was more inspired to be better as an educator. That year, we had those 10 iPads and after that, our principal was very supportive and he got us 100 iPads to be 1:1 in our district. I didn't know much about it back then and Apple couldn't help us very much with how to deploy iPads at that time since it was so new to them too. I had heard of

> *Apple Distinguished Educator*s through Twitter and I received a lot of support from other educators on Twitter. That was the main thing…I jumped on Twitter and quickly got into this big, huge network of other educators that were just like me here in this little bitty town. So, I was speaking with educators across the world in Australia and the United States and I heard more about this program and I just fell in love with Apple. I went and got myself an iPhone and I applied.

She discusses how applicants were required to create a "two minute showcase of who they are as an educator using Apple products" and addition to completing an "8 page write up." She says, "I worked hard on a video and luckily I got accepted." She describes her reaction to being accepted:

> I was very honored and thought, "Wow, this is a huge network for me to be a part of…the best of the best." I believe there were 75 teachers from North America, which includes Canada, Mexico, and the United States. I think they had over 1500 applicants, so to be whittled down to 75, it was an honor. I knew other teachers who were *Apple Distinguished Educators* and they were the ones that I always kind of looked up to and went to on Twitter. They had always supported me and helped me, so I was elated about being selected.

Around this same timeframe, Angela also learned about the *Google Teacher Academy* (title before it was called the *Google Innovator Academy)* and she decided to apply to that as well. She mentions how the application was a shorter process and included a one-minute video with a small written portion. She describes her motivation to complete this application:

> After I was honored as an ADE, I heard about *Google Teacher Academy* as another network to join...It was close to my region, although it was still eight hours away and I said, "Well, I'm going to give it a shot." I thought that could help me because we also had become a Google district with G-Suite and students got their own Gmail addresses. So, I applied for that with a video and actually used a lot what I did in Apple for the Google one.

When discussing what means to earn titles such as *Apple Distinguished Educator* and *Google Innovator*, Angela says they help her to know about the newest technology trends that are happening before anyone else and to remain "in the loop." She explains, "I want to know it, learn it, and then share it with my colleagues." She reiterates that for her, it is not about getting

the recognition but instead about learning how to integrate innovative technologies in her classroom and connecting with other like-minded educators who are passionate about the same things.

Jared (P4). When Jared previously worked as a TOSA, he had an administrator who was a *Google Certified Innovator* and mentor to him. Initially he was not particularly interested in the idea of "badging" or earning recognition for his learning, but over time the idea grew on him and he was encouraged to submit an application. He says:

> I started the whole badging system and the Google Innovator program later because for me, I was never big on badges, credentials, certificates, or whatever you kind of want to call that genre. I definitely know some are more "weighty" than others, but I guess I just got to the point where I was doing professional development and noticing that was becoming more important. So, I started with getting my Google Trainer application in. At the same time, one of my colleagues in the district was accepted to attend the Google Innovator Academy in Denmark. I was like, "Wow, like I feel like I'm kind of being left behind." So, I guess that lit a little bit of a fire under me when my friend got accepted.

Jared further describes his motivation to apply:

> My former boss was a Google Innovator and he always encouraged us so to pursue those types of things because he felt it was important for us to grow as professionals. After seeing him and some of my other colleagues that I had known go through some of these programs, then seeing some of the social media posts and hearing about what people had experienced, I think all of that hit me at the right moment. So, I said, "Well, I'm going to give it a try, why not..." So I did.

Jared also discusses coming up with a relevant problem to address as part of his Google Innovator Project when he was applying:

> I was thinking about if I was going to apply, what would I do a project on and what would be my problem to tackle that hasn't been done before where it's not going to be redundant in some way. Maybe that's a bad word, but you know some projects that you see are very similar and sometimes it's kind of people just recreating the wheel...if something already works, why do that?

Jared's reflective thinking on the importance of teaching parents about digital citizenship compelled him to create a video application discussing this as a problem that he would like to

tackle in the Google Innovator program.

Upon being accepted into the program, Jared explains how his colleagues and people he knows in the education technology field through Twitter chats and other PLNs, gave him "props" for earning the Google Innovator title, although he explains how some said, "Oh, I thought you were one already." He admits that this made him question why educators need these badges or titles and he refers to them as "almost like a stamp of approval," but he admits that it means a lot to earn the recognition and to get acknowledgment from his colleagues. He also discusses how he has more respect for others who have the titles because he now knows the level of involvement that is required to be a part of these programs— at least for the Google one.

Sarah (P5). The private Christian school where Sarah works is a "Microsoft Showcase School." Every teacher is required to earn the *Microsoft Innovative Educator* (MIE) badge within the Microsoft community by completing the necessary professional learning courses. Only a handful of teachers have gone above and beyond to pursue the "Expert" level, including Sarah. She explains, "we were all required to become MIEs and it was highly suggested that those of us who had been there a year more become *MIE Expert*s...I think just like in any school, we have varying levels." Sarah discusses how she sees this as an advantage of her school because she was previously unfamiliar with Microsoft products until she began working here:

> I switched into the Microsoft stuff my first year and just really enjoyed exploring those technologies and how I could use them in a project based classroom. They really allowed me to do a lot with my third graders. Our school got labeled that year a, "Microsoft Showcase School" as well...We don't really have an option, we have to use those products in a way that is what the *MIE Expert* communities are looking for.

She also describes how she was getting mentorship and support from the head of her school that first year and how she was encouraged to apply:

> I had a mentor in the head of our school that really encouraged me to join. She'd been working with the Microsoft team a lot. She told me, "You know, you have the skills...you're doing all the things, you should try it" (referring to the *Microsoft Innovative Educator Expert* program)— even though I was a first year teacher. So I created the artifact and have been in the community and reapplied every year since.

When Sarah first applied to the *Microsoft Innovative Educator Expert* program, she created a Sway presentation with student artifacts to showcase how she was using Microsoft products in her classroom to support learning. She has since created new presentations each year to re-apply into the program based on innovative projects and curriculum she is developing.

Sarah discusses what it means to earn the titles, especially as a young teacher. She describes how it "labels her skill sets" because she spends a lot of time "researching, designing, and creating." Sarah also explains how she believes "when filling out a resume, people are usually looking for years of experience," but the titles are a way for her to show the other skills and abilities she has, which are better than her just saying, "Hey, I'm good at using OneNote in the classroom." She elaborates on how this highlights the knowledge she has and the title represents things she has done such as developing "complex lesson webs that integrate all subjects while weaving technology and computer science into them." Additionally, she mentions how the title allows her to "make connections" because of her involvement in the Microsoft programs.

Sarah advocates that she thinks the people who do really well in the *MIE Expert* program and with technology (including herself) have the "desire to connect with others while continuing to grow and learn." She also says they need to have a "growth mindset" because "technology is constantly changing and in the programs you learn about the new technologies quickly." She reiterates, "if you don't have this type of mindset and you're not interested in learning, then it's not worth the time and it ends up frustrating the people within the group." Sarah explains how

they actually discuss this in the program and give Microsoft feedback about what the process should be for applying or re-applying into it.

Michelle (P6). Michelle teaches in a Microsoft district and at the school where she previously worked, the entire staff was required to be certified as a Microsoft Innovative Educator (MIE). She describes how many of the teachers "grumbled and groaned because it required extra after school trainings," but she thought to herself, "Well, I can't get out of these meetings and if I'm going to learn this stuff, I might as well figure out ways to use it." So while she was working as a Media Specialist, she started to apply what she was learning in the MIE training into her lesson plans with students and when communicating with other teachers. She was then encouraged to get more involved by the MIE Course Facilitator, a *Microsoft Certified Trainer* who also worked in her school district, and this led her toward pursuing the extra "E" (referring to MIEE). She discusses the application process:

> You had to talk about how you use Microsoft tools as a MIE then you had to create an Office Mix, Sway presentation, or some kind of artifact. So, I created a Sway on what I was doing with the tools as a Media Specialist. I included a voting activity for the best book around election time where I had used Microsoft Forms with the students. I was also teaching them how to use Sway, so I had examples of that as well.

Michelle explains how she was excited to be accepted, especially because she thinks the program is competitive:

> I think there has to be some level of competitiveness because the teachers that I know who have applied are excited about Microsoft and have done so many more cool things than I have... Plus, I know other *MIE Expert*s who have tried to bring really great teachers into the community that were just like, "Oh my gosh, I know this awesome teacher who is doing amazing things," but they didn't get picked.

As she reflects on the types of teachers who participate in these programs and what the titles mean, Michelle says:

> I definitely think it (referring to the *MIE Expert* program) is more beneficial to the "self-starter" type of teacher because I would agree with what that *Microsoft Certified Trainer* told me about getting what you want out of it. There's no one looking over your shoulder saying, "You have to go to listen in on the calls, you have to follow the GroupMe or the Facebook page, or you have to engage in this or that area." So if you choose to get your extra "E" (referring to moving from MIE to MIEE), but you don't do anything— or even if you are doing cool and amazing things in your classroom, but you don't tell anybody, then you know... you just have to be that kind of person that's going to take what you're learning, do something with it, and be willing to share because I think that's a big component of all these kind of programs.

Summary. Throughout interviews, teachers described their motivation for submitting applications into the technology vendor-sponsored programs and what earning these titles meant to them. Their stories offer insight into what they feel their professional identity was prior to being selected and how their identities continue to evolve as a result of participating in the programs. Five out of six participants mentioned being surprised and excited to be accepted into these programs because of how competitive the application process was. Only Jared was hesitant to apply at first because he wasn't sure what earning the title meant, but he admitted appreciating the recognition and acknowledgment. While all of the teachers advocated that they did not apply to receive the recognition, they expressed how they were encouraged by other participants to apply and it was an honor to be accepted so they could serve as role models to others.

All teachers described themselves or the ideal participants of these programs as highly motivated with the continuous desire to learn. In fact, several of the participants referred to themselves as having a "growth mindset," being "early adopters" of new technologies, or as "self-starters." Jennifer and Angela were piloting new iPads and *G Suite* tools, so they discussed wanting to expand their PLN to get more support and help their schools with technology deployment. Keiko was similarly using iPads in creative ways at her school and connected with other ADEs via Twitter because she felt like they are smart "go to people." Meanwhile, Sarah

and Michelle were both working in Microsoft schools and required to become MIEs, although they had mentors who personally encouraged them to pursue the MIEE program because they were advanced in their technology integration skills and always eager to learn.

Theme 2- Identity as community membership: connecting with other educators.

Membership into the programs and their communities includes: *mutuality of engagement* (how participants interact and work together), *accountability to an enterprise* (how participants invest and contribute), and *negotiability of a repertoire*, which includes how participants draw from memories, artifacts, and experiences to negotiate their identities (Wenger, 1998, p. 152).

Keiko (P1). Keiko describes the connections she has made with other participants while in the program:

> It's all about people. It's connecting with people face-to-face and listening. Even if you don't get really close to them, you get to listen to them or later you get to see them on Twitter or Facebook. It's all about getting inspired by them and we have mutual respect for one another. So, when I go to the institute or those big conferences like ISTE, sessions will be good, but that 5-10 minute conversation with another ADE makes it so much more meaningful and the experience more worthwhile. I think that's the number one reason to join. If somebody asks me, "Should I do it?" I would definitely recommend it because of the people that you meet.

She elaborates further on how she has developed relationships with other educators and remains connected with them online:

> It's amazing how we can connect in just a short amount of time. I guess I knew a few people through Twitter and Google Hangouts, but when you finally meet with them face-to-face, the relationship gets real and we do still connect just through messaging or whatnot.

Additionally, Keiko mentions how she feels less like an "outcast" after becoming a member of the community and meeting "people like her," who are passionate about the same things:

> More than likely, a lot of people have been in your shoes because you kind of stand out or feel like outcast at your own school just because you go out there and go get it. There aren't many people like that, so I think it's great to meet people like you and you all of a sudden kind of fit in.

Jennifer (P2). Jennifer spent four days in London for the *Google Teacher Academy*. She says Google and the Computer Using Educators (CUE) organization based out of California led the academy, although she mentions the program is now referred to as the Google Innovator and is run by an organization called EdTechTeam. She describes her experience:

> It felt like a really intimate conference with a select group of people who were like-minded, which was really unique because a lot of times you go to a conference and you're just intimidated by the size or you don't know anybody... We did a lot of learning and sharing. There were different activities to get to know one another, our personal interests, and what we do in our jobs. We also broke out into small rooms and there were presenters in each room who focused on teaching and learning using Google Apps.

Jennifer explains how she believes teachers really want to be there since they are applying to get into the programs. She describes what she took away from the experience with regard to connecting with other people and building relationships:

> I think the days that you are there, you really do connect with people, feel comfortable, and you start to build relationships... The educators that were there really shared a lot of best practice about what was happening in the field. I came home with so many ideas and I felt like the learning kept going after we left...I'm still in contact with a lot of people that I met.

When Jennifer was later recognized as an *Apple Distinguished Educator,* she flew to Cork, Ireland for an in-person professional learning institute that was about a week long. She describes how, "it was a little bit of a bigger conference, but the same kind of a venue where you're learning, you're sharing, and you're going to different sessions." She saw this experience as a great opportunity to meet people from all over the world. She mentions collaborating on global projects with other participants living in different countries after attending the *Google Teacher Academy* and *ADE Institute.*

Jennifer elaborates further on how her membership allows her to connect with others and share ideas for integrating technology in schools:

> I think more what it does is it connects me to other people who also have that designation... So they might reach out to me on *LinkedIn* and say, "Oh I didn't realize you moved out back to the U.S. and now you're back, it would be great to connect with you. Do you know our schools are four miles away?" So really it's a way for people to connect with me or if a school is thinking of getting iPads or something, they might reach out to me for ideas.

She explains how she also follows other ADEs to get ideas and see what projects they are working on. Jennifer says, "When I want to follow somebody, I might look and see if they are also an *Apple Distinguished Educator* and I definitely want to connect with them because I want to hear what they're doing." She reiterates how these connections allow her to continue learning and growing as a teacher.

Angela (P3). Angela describes how the *Apple Distinguished Educator* program is "kind of a hierarchy— participants have worked their way up the ranks and then they do a lot of planning for the institutes...New ADEs just coming in have a mentor." She elaborates on how she was assigned a mentor (another ADE) who had been in the program for ten years. Her mentor guided her during the first year and was there for support as needed. After attending the *ADE Institute* and *Google Teacher Academy*, Angela discusses how she also sought further guidance from educators on Twitter:

> You know, there were many nights I was in here (referring to being in her classroom) until seven or eight o'clock at night trying to figure out these iPads and I couldn't. It would have been very easy to be frustrated and give up at the very beginning, but through Twitter people really helped and inspired me.

She mentions how in later years when she gained more confidence with technology, she would actively post on Twitter to provide support for other educators:

> I'd go home at night… I'd make dinner and what did I do? I didn't ever sit and watch TV. I was on Twitter talking with people, sharing things, re-tweeting,

> making sure to get my stuff out there, and answering questions. People would direct message me on Twitter for support—just like tech support from across the United States all day long for me to help them troubleshoot whatever they were going through.

She explains how she built connections with other educators as a highlight of participating in the *Apple Distinguished Educator* and *Google Teacher Academy* programs:

> You have an emotional attachment...you become friends with these people. When we would go to conferences, we would meet up and we'd go to the newest microbrew place. We became friends in supporting each other. So maybe not my best friends that I hang out with on the weekends or anything, but there is definitely camaraderie between people in those organizations... I mean, I felt much more comfortable with them than a lot of people that I work with... We're very like-minded and passionate about certain things.

Jared (P4). Jared describes attending the Google Innovator Academy run by the EdTechTeam in Venice Beach, California for two and a half days. He discusses how "connecting with the other like-minded educators" and working on their "Innovator projects" was one of the biggest benefits of participating in the academy*:*

> I met more people that have definitely helped to push my mind with some ideas…Just seeing what other people are doing, I think there's definitely a benefit of putting everybody in a space and being like, "These are your projects, these are your passions, these your ideas." I would have never have gone with all these people in a room with this pretty intense learning situation for pretty much... out of 48-56 hours, probably like 30 of those hours. So, I guess, having all of that energy and those ideas definitely helps stimulate your brain in some ways and pushes your thinking... but I think that again goes back to connecting you with the people that are there. It's kind of like, "Let's get together and just put some people that are very passionate in a room." I think that's the biggest thing...it's the people that you meet and having those ideas that were passed along.

Jared elaborates further on how meeting new people and sharing ideas at these events has impacted him:

> When I think about educational technology, I feel like it's kind of a small sector and when you go to conferences, you see a lot of the same people there. So in this program, you meet people that you might not have met before...The biggest impact has been the people and the ideas that come with those people...Also, I

> think some people that you may not know— like perhaps some of the older cohorts are a little bit of a fraternity or family that you become a part of.

Jared additionally participates in Google Hangouts and connects with the other Google Innovators via Google Groups and Twitter. He mentions how people are active in the groups, often posting at least once a day and he pays attention to what they are doing. Jared says, "I stay connected to them more than my average educator friends." He describes following another Google Innovator who is a full time classroom teacher across social media platforms and getting inspired by her posts with examples of projects she implements with her students. He elaborates further on what he thinks is important about sharing ideas in the community**:**

> When I share a lot and I try to contribute, I think people value that collaboration and help. It's kind of a culture you can be a part of. I don't necessarily think it's a "secret club." I think that a lot of us do some awesome things and we don't necessarily take the time to share it or make it accessible freely.

Jared describes idea sharing as "expanding one's PLN as gaining further social capital." He states:

> I feel like people are...maybe this is dehumanizes us, but we're like tools in a way...For instance, I know this person who gave me these great ideas of how I might implement SketchNote because I'm connected with them on Twitter. So it's like when you have more people that you can connect with… when you have a bigger PLN, you have more "social capital." I don't know if that's quite the right term for it, but it's like you gain more ideas from collaboration. So I feel like for me, that helps and I know for some people like it definitely helps them more professionally.

Sarah (P5). Sarah explains how she wanted to become a member of the *Microsoft Innovative Educator Expert* program so she could gather new ideas:

> So for me, it was joining to be part of the community and seeing what other educators outside of my school were doing. Even in the transition within my school over the four years, there have been some years where there aren't as many teachers who are into discussing and really thinking about the philosophy of how all these tools are used and that's what I find interesting...It's not about the technology itself, but more of the mindset that a teacher needs to utilize it...What

> are best practices, what are creative ways teachers are using it to uplift their students, and then it also became a way I could share out more.

Sarah also discusses how she utilizes social media platforms to maintain connections with other educators integrating Microsoft products:

> I follow and I get connected with everyone on Twitter, which is another advantage. Through social media, you start connecting with more of the *MIE Expert*s and you get glimpses into other parts of the country. So you do get to see, especially if you're near where a conference is, teams will— at least some people— go and visit different schools. So I've seen a lot of activity and that's how I think the education team at Microsoft makes connections with schools as well by hearing what different *MIE Expert*s are doing.

In addition to building connections, Sarah says she feels supported as a new teacher. She discusses how "a lot of the people in these communities are much more experienced" and describes herself as "the newbie with these things." She explains how more knowledgeable participants have been mentors who offer guidance as she learns about new tools and designs lessons, especially with Minecraft. Sarah says:

> I've collaborated on a couple of different projects with other mentors in designing lessons and sharing ideas. Sometimes it's them answering direct questions or me saying, 'Hey, I have this idea...what are your thoughts?' and sometimes we get to work directly with the Minecraft team.

Sarah mentions a project that some of the "Minecraft original" teachers have developed called, "Cross Pond Collaboration." This is an online space where teachers from the United States, Canada, and England are building "student-centered Minecraft worlds" and they share the process with one another so they can be incorporated in schools around the world. She explains how they have designed several "phenomenal language arts worlds including a Romeo and Juliet world" and they are always open to working together on creative ideas. Sarah reiterates how much she appreciates being able to collaborate and learn from other teachers in the community.

Michelle (P6). Michelle discusses how *Microsoft Innovative Educator Expert*s are required to bring new participants into the community:

> As a *MIE Expert*, you're encouraged to bring people into the MIEE community, so I have encouraged some of my fellow teachers and I'm not sure if they all completed their applications. I know a couple that applied and didn't make it. So as of right now, there's only one other teacher at this particular school who is a *MIE Expert.*

She describes how it remains up to participants how much they want to get involved in the program community:

> The *Microsoft Certified Trainer* who recruited me said, "You can get as involved as you want. If you want to be super involved, you can— or if you just want to dibble dabble here and there, you can do that." I think I've definitely cut back since I am now more Apple focused in my new classroom. I try to keep up with the regional and U.S. GroupMe chats, but I don't do the Facebook. MIEEs from my first school all kind of scattered, so I do still kind of keep in touch with those people as well.

Michelle appreciates being able to maintain relationships with other teachers and getting ideas from them, even if it's from a distance. She sees this as a huge benefit of participating in the program.

Summary. A key aspect of participation and maintaining membership that all teachers mentioned is the connections they formed with other like-minded educators. They especially believed in building relationships as a result of joining the program communities. Keiko, Jennifer, Angela, and Jared explained how meaningful it was to meet other "like-minded people" that shared a similar passion for learning about technology integration. Keiko even discussed how she felt like an "outcast" at her school, but was reassured and inspired by the other ADEs, which helped to build her confidence. Jared expressed how he was able to meet people that he may not have otherwise come into contact with before and how this was the biggest impact.

Teachers additionally discussed sharing ideas and expertise as critical to their identity formation and professional development. Jennifer, Jared, and Sarah emphasized how they were able to share ideas while working on projects with other participants and connecting in the online back channel spaces. Similarly, Sarah and Michelle discussed how they participate in regional meet ups with other MIEEs. Michelle explained how she even tries to recruit other teachers into the program. Keiko and Jennifer also mentioned attending larger conferences such as ISTE, but how it was much more personal to participate in the intimate *ADE Institute* so they could break out into smaller groups to share best practices that they could bring back into their own classrooms. Moreover, all teachers discussed receiving support from peer-mentors and feeling a sense of camaraderie. This element of collaboration appears to be most important to participants with regard to the programs and their professional identity development.

Theme 3- Identity as a learning trajectory: applying new skills learned within and outside of the classroom. Wenger (1998) depicts identity as a "learning process that incorporates both past and future into the meaning of the present" (p. 162). He also discusses various types of trajectories that occur within communities of practice: (a) peripheral (by choice or necessity but not necessarily leading to full participation), (b) inbound (newcomers joining with the prospect of becoming full participants), (c) insider (participants constantly evolving as full members), (d) boundary (linking across other CoPs), and (e) outbound, which may include departure from the community (p. 154).

Keiko (P1). While discussing how some participants get more involved than others, Keiko explains how several of the ADEs that she has connected with are authoring in iBooks and publishing their own content. One of her ADE friends is even working with a book creator to write her own book. Keiko describes how this participant has also been contacted by Apple to

present at conferences and travel arrangements were taken care of. While Keiko has not personally been asked to present for Apple, she shares several artifacts which include presentations she has put together for conferences on topics such as: "Learn to Code and Code to Learn," which has examples of how she has used coding in her classroom through robotics and the Scratch Junior application, "Show Your Learning on Scratch Junior" (which shows more detailed lessons with her students learning computational thinking through block-coding to build stories), and "Making Learning Personal in Primary Classrooms," which is about promoting student agency, engagement, and student-driven learning with technology. Keiko also mentions that *Apple* has an online space to log activities and how she feels this is an accountability system that's really up to the participant to keep up with:

> Maybe it's a good thing, but once I got accepted, then it's really up to me to keep trying. I could just sit and do nothing and they won't bother me and I won't bother them. If there were a little bit more...I don't want to say push, but a little bit more communication maybe… because once we get busy with the school year, I just don't think about ADE for a while and then all of a sudden, I'm like, "Oh, I haven't done logging in quite some time." So I don't know...maybe other people are better about going onto the ADE site and then keeping in touch and just getting more involved.

Additionally, Keiko mentions how many of the ADEs she knows are no longer in the classroom. She says they are "coaches or technology integrationists who can go deep in the field and do a lot more with Apple products." While Keiko has considered moving into a coaching role, she says, "I just don't want to leave the classroom because I am having so much fun with the kids and the tech." She explains how her school does not have positions for technology integrationists; otherwise she would potentially be interested in that option. Keiko describes how she questions what her next level of learning should entail:

> Where is a happy place? I feel like when I was getting into the *ADE* program, this would be the next level for me, but once you're in, you begin to question what's

> out there again. So then from here, where do you go? What's the next step? Do we go out more and present outside of our own state?

Keiko elaborates further on how she thinks about applying into other programs and learning about different technology products. She mentions how one of her close ADE friends is also a Google Innovator and she has been encouraging her to consider joining because of the unique innovation focus. Keiko has gone through some of the Google certification process, but has not decided if she wants to continue pursuing it.

Jennifer (P2). Jennifer describes how she tries to contribute within the ADE community by publishing iTunesU courses and other artifacts. She shares an example iMovie she created called, "Getting Classy on Clips," which demonstrates how the new Apple Clips application can be used for students to share personal stories about themselves at the beginning of a new school year. She explains how she has even met with people from the company to give them ideas and they have published content based on these conversations. She also describes how she gets ideas from participating in alumni events that she has brought back into her school:

> I got a great idea from one educator who presented at the ADE Alumni conference… It was called "six words story," which comes from Ernest Hemingway, where he had a little picture with six words about it and it spoke volumes. This ADE was using the strategy in high school with more advanced content, but I thought to myself, "How can I bring this to elementary school?" I was like "I can get kids to do this about being in their grade level." So, I started doing that and it's just spread like wildfire in my whole school. All of the kids do the "six word story" and they really love it. They enjoy taking the pictures and making the words, so it's really powerful. You really get to know the students including how they feel about school and learning.

She elaborates further how this was an "idea that she took and launched in a different way from an elementary school perspective."

In addition to publishing content and sharing ideas or resources, Jennifer was also hired as a consultant for Google to train teachers who are launching new Chromebooks in their

classrooms. She discusses showing them the benefits of a Chromebook and other Google tools by focusing on Chrome, G Suite, and Google Classroom since she "uses these tools frequently and they are easy to work with." Jennifer enjoys modeling for other teachers and although she has previously worked in other leadership roles that include: Library/Media Specialist, Technology Integration Coach, Digital Learning Leader, and Technology Integration Specialist, she is excited to have her own "STEM Maker Design Studio Space" this year so she can try out new ideas with students. She explains how she has observed a trend where teachers in the ADE and *Google Innovator* programs are becoming instructional coaches or technology specialists, but she feels that part of the learning can also include returning to the classroom.

Angela (P3). When Angela first attended the *ADE Institute*, she describes creating a project called, "My One Best Thing," where she had to showcase what she was doing with Apple products in her classroom. As part of this project, she shared about several iTunesU courses that she has developed for her students. Courses include nonfiction reading topics such as: planets, presidents, fungi, and the underground railroad, in addition to fiction books her class reads each year. When asked for artifacts, Angela provides links to several of her interactive courses and other presentations she has created about how to develop iTunesU courses, which include YouTube videos and podcasts on related topics.

Although she was already creating the iTunesU courses on her own, Angela says that her participation in the ADE program "helped elevate her work to the next level." She even connected with other organizations including ACSD, EduCore, and the Department of Education to develop ELA Common Core resources for kindergarten through fifth grade. She also co-authored an iBook to help her school earn recognition as an Apple Distinguished School in 2013. She explains:

> We became an Apple Distinguished School in 2013 because we were among a handful of schools in the state to actually go 1:1 with iPads. We had people coming here all the time and I was giving them tours. So maybe I would be here, but I'd only be teaching half the day. They would tour our school, watch me teach, and then I'd have to go and sit with them for an hour or two for question and answer sessions. After we became an Apple Distinguished School, we did not re-apply and that was just because it's kind of like a "feather in your cap" type of thing. We received a plaque, but it didn't include a whole lot of networking or anything. You were just kind of awarded because you're innovative.

Additionally, Angela says she got more involved in presenting at conferences and other events:

> There's an expectation that you're out there presenting and then you're away from the classroom. It was almost like a job... I was presenting all the time in schools and going to conferences. I was helping teachers to create iTunesU courses, which included traveling out of the state and going to California. I went to Cupertino and I had to present about my iTunesU course projects to higher ups in Apple...I was showcasing what was going on in the educational market at that time.

Apple commissioned her for some of the presentations, although she has also voluntarily led conferences in her local area. Angela explains how she was giving more than she was getting in return:

> We have a yearly local conference here that I run and when you go to present for Apple or Google, you are working all the time at these conferences, so it's hard to get anything for yourself. I've never really experienced much of other conferences as a spectator because I was always leading the sessions and people were coming to me. So, I would like to switch that role a little bit. It's tough though because when I did go to those things, there wasn't always very much that was new to me since I always kind of kept up technology.

Angela says she was starting to feel overwhelmed because there were so many days that she could not be in her classroom. She explains, "I would have guest teachers because I'd be gone everywhere." She discusses her continued commitment:

> I'm not trying to brag or anything, but I was a tech leader in the state and I put hours and hours of time in for two years straight into being the best. I was at my max with the amount of days I could leave during the school year and then my summers were filled up with going in to support other teachers. I did a lot of

> above and beyond work and you don't make any money on it. Finally, I decided that I was honestly burned out.

Angela reflects further on some of the pressures she was feeling as a role model to other teachers:

> There were probably two or three different times the news or CUE would come in and interview me. I was kind of the “poster child” for our district. That was a heavy hat to always have on too… A lot of pressure and sometimes people that you work with don't always want to see the same face or they don't have the same vision as you. I also think educators are human and I guess occasionally there's jealousy or something like that, but mostly everyone was very receptive. I always wanted to be supportive of my co-workers and I would tell them, "Don't sit there and pull your hair out for 20 minutes or an hour... come see me if you need help with the technology."

As a result of being so dedicated to leading and supporting other teachers, Angela was awarded, “Technology Educator of the Year” in her state. She describes presenting at the event and later deciding to take a step back from participating in the programs:

> I've kind of stopped… I stopped with my web page, I stopped going on Twitter, and I haven't posted anything on Facebook in two years…It just all took too much time. I had two young boys and I wanted to spend more quality time with them.

Angela is proud of her accomplishments and says maybe she will get more involved again after her kids are older. She even mentions the possibility of coaching others in the future, but she still is not sure about leaving the classroom. She describes how she now participates in the ADE program from a distance:

> Once you leave Twitter and you stop putting yourself out there, it kind of like dries it up (referring to interactions with others), but honestly that was really what I was hoping for... I took down my website and I haven’t posted anything on Facebook in two years...I still read, follow some stuff, and receive morning emails from Apple—and I pay attention to those. I am also still part of the Apple private community, but the thing with programs like this is that you get what you put into them. So, I'm just not putting as much into it anymore. I stay connected with the Apple people...I watch and see what they're doing and I continue to learn that way, but I'm also a stronger tech person now than I was in 2013 when I was first starting out.

Jared (P4). Jared is currently working on his Google Innovator project, which requires him to focus on a relevant problem in education with regard to technology and an idea for a solution. He explains how he reflected about his childhood as he considered a problem to tackle. He recalls when his mom brought home one of the first Mac computers and what that experience was like. He recognizes that he grew up in a generation with new technologies, but he did not have the same level of exposure as kids do today. From his perspective as an educator and parent, he thinks deeply about the importance of raising children to make safe decisions in the digital age and how this is a topic that has only become prevalent in recent years. He says:

> I think it's a very important issue that educators know a little bit about and I find that parents know even less about it. I'm sure every district has at least talked about digital citizenship on some level, so I feel like teachers know about it but what do parents know about it? I feel like a lot of times as teachers it was kind of expected for us to do that work...Meanwhile, I felt like as parents, what are we doing about it? How are we raising our children to make wise decisions? How do we make those rules? That was my problem...how do we help educate parents?

Jared describes how he met with other educators in the new cohort to work on addressing problems in their schools through a design thinking process:

> So you go through the design thinking process, trying to identify what your problem is and you get inspiration from coaches that are there and also the other attendees. It's mostly about design thinking and there are mini sessions on what inspires some of the coaches and the people that are working at Google. You think about your project and go through the design thinking process... They sandwich it a little bit with an informational session on maybe what Google's offering, but a lot of it is just time spent working on your project and connecting with the people that are there.

As part of his project, Jared has been working with the Computer Using Educators (CUE) organization to put on digital citizenship summits for educators, teachers, and parents in addition to vlogging (video-blogging) and creating podcasts. He has also been assigned a mentor for support as needed. He explains more about how the process works and how he is expected to share his progress with Google:

> They (referring to Google) have a midpoint check-in and end of the year check-in, but since people's projects can look completely different and be at varying points, this could take years. So, hypothetically speaking, your project is something that you can carry on with you. It's not something you just kind of do for a year and you're done. It's something you're passionate about and you might say, "Well in this year, this is what I've accomplished." It's a big chunk of your life, so you have to be very committed to do it.

In addition to working on his Google Innovator project, Jared also earned his Google Certified Trainer title so he can help other teachers with Google tools as a consultant. He discusses how he enjoys mentoring and providing support with technology, especially since he has previously worked as an educational technology TOSA and instructional coach. As part of his professional learning trajectory, Jared recently decided to return to teaching kids. He says, "I was ready to go back to the classroom... I got into teaching to be a teacher and I feel like it's important as a coach to be what I call 'classroom fresh' and go back into the classroom when it's time." He discusses how he is still "coaching teachers— whether it's informally through Twitter or even just working with colleagues." He even shares several artifacts he has created including links to his professional website, *Anchor* podcast page, classroom Twitter account, and other presentations he has put together on topics such as: Google Classroom, Digital Storytelling across Google MyMaps, using Google Slides to create interactive posters, etc. Jared also explains how he is currently working on an ISTE Certification and may consider going back to school when his kids are older to pursue opportunities teaching in higher education.

Sarah (P5). Microsoft has an official summit that occurs annually for MIEEs, but Sarah has not yet had the opportunity to go and she plans to attend the one taking place this year. Sarah plains how her school director goes every year and she shares what she knows about the summit from speaking with other MIEEs including her director:

> Generally, they have a few things they will highlight like specific technologies. They actually just sent out a form survey of what we want it to look like and what

> we'd like to learn. I know a lot of times they'll bring in professional development on how to use the micro bit and some of the more advanced things that are difficult to learn without actually doing it hands on. It will probably be led by a combination of *MIE Expert*s and then people who work at Microsoft within the education team.

Although Sarah has not yet attended a *Microsoft Summit,* she discusses how the company offers a travel grant program, which has allowed her to present about her teaching at events such as: the Texas Computer Education Association (TCEA) Advancing Teaching and Learning with Technology in Education Conference, the Northwest Council for Computer Education (NCCE) Summit, and the Future Education Technology Conference (FETC). Sarah describes in further detail how she presents about Sway, OneNote, Minecraft, and other Microsoft tools in the context of instructional units she has developed that incorporate STEM skills. She shares several artifacts such as Sway presentations she has created for conferences including: "Minecraft: Inspiring Young Engineers," which demonstrates how Minecraft can be used to promote critical thinking skills, "Get Creative with Minecraft," which models how students can identify and solve problems while playing Minecraft, "Developing Your Minecraft PLN," which discusses how students can collaborate through Minecraft with other classes or grade levels and how teachers can similarly work with other teachers globally, “Minecraft Museum of Me," which provides instructions for how students can create projects in Minecraft to share more about themselves, and "Gender Equality," which highlights research projects students have developed and integrated within “intercultural Minecraft worlds.”

Sarah discusses how the travel grants provided by Microsoft have additionally allowed her to bring students to conferences, which she believes is extremely beneficial for them:

> Microsoft will cover a couple of conferences each year. So I've gotten to utilize that and it’s been just a phenomenal experience. One in being able to hear what they’re doing and also in empowering my students because we get to bring our students with us...We have students present with us and that's really impactful for

> them. Ultimately, it's about the students and my involvement in the community in some way— I want it to impact my students and that's sometimes directly through their voice and what they share. Sometimes it's something I learned that I can bring into the classroom or for discussing something and trying to decide, "What would students enjoy?"

She explains how students are given the responsibility to create posters for the conference sessions so they can share about their projects in a meaningful way. They also take turns presenting about their learning, which allows them to demonstrate the power of these tools for other educators. She feels this not only empowers them, but it also helps to build their confidence. Sarah also explains how social media plays a big role in her presentations and overall professional growth:

> Social media is a big part of all of these groups. Even when I go to a conference, my requirement is that I have five tweets a day with the #MicrosoftEducation hashtag attached to be constantly sharing out and that's kind of on the side… These programs are very beneficial to us and they're also beneficial to Microsoft. I definitely acknowledge that it goes both ways, but social media is a huge part and for me, it was something as an educator that I did not think I was going to get involved in. I was never a social media person growing up and my perspective has completely changed because of the communities I've gotten involved in with the *MIE Expert*s, *Minecraft Global Mentor* group, outside "TweetMeets" and all of that.

In addition to presenting at conferences and actively participating on social media, Sarah writes and publishes Minecraft Education lessons. She has even developed videos for the Smithsonian Museum to showcase how she uses Minecraft in the classroom. Moreover, she mentors other teachers by creating collaborative lessons and modeling how to effectively implement them. She describes supporting a first year teacher:

> We did a collaborative Minecraft lesson and not only did I show her the design of a multi-disciplinary lesson (including math and a design architecture writing project) but, I also helped her to have a positive experience with Minecraft...To me, that's the best way to mentor someone in Minecraft is if you can implement collaborative lessons together so they have a positive experience. I think that's been really valuable.

Sarah also mentions helping another teacher with developing a presentation to convince administrators to bring Minecraft in his school district. As a result of this, she has been pulling together artifacts of different projects she has done for documentation. She says this allows her to keep track of "what she has learned and what she knows."

Sarah describes herself as having a "growth mindset" with the drive and need to "constantly be learning." She explains how she has learned so much in her first few years of teaching and is still learning from new experiences, but she is eager to continue her education. She has decided to pursue certification and a master's degree in "human-centered design engineering." She elaborates further about the program and her goals:

> It's a really cool program at the University of Washington. A lot of the people who come out of it become "user-experience designers" or program managers... It's multi-disciplinary in a computer science realm and it's very design and data focused, but it also allows for a lot of flexibility. My plan is get the certification first, but by that point, hopefully I'll have a better vision of whether I want to take more education, neuroscience, or leadership classes. They will actually let me pull those pieces together... I'd love to find a blend of working with teachers, but also designing technology as well...I also still love being in the classroom, so we'll see where that journey takes me. I'm expecting to be in a traditional teaching role at least for the next few years.

While Sarah's school encourages master degrees, she discusses how her participation in the Microsoft programs have especially inspired her to move down this trajectory:

> It's been actually my work with the Minecraft and OneNote teams that has really gotten me interested in all of that. These programs have helped me to see another side of education that previously I hadn't been aware of. So for me, it's really exciting to learn about all the possibilities with technology and education.

Michelle (P6). Michelle discusses the *Microsoft Summit* and how the company previously paid for multiple teachers to attend this annually, but she thinks they have cut back on this and she hasn't yet had the opportunity to attend:

> The first year that I applied to be an *MIE Expert*, there was a big National "powwow" of MIEEs or maybe just in MIEs, and they (referring to Microsoft)

> were covering travel expenses...Microsoft paid for six teachers from my school to go to Denver for a week in the summer, but then I don't know if they just were like, "whoa...we've got to put the kibosh on this...This is too much money," so they don't do that anymore. I'm not sure if the travel program used to be more robust or if it always was just the two conferences a year for the MIEEs. I think from whispers, I've heard that they have scaled back on some of their financial gifting.

Although Michelle has not participated in the *Microsoft Summit*, she explains how travel grants have helped to cover her expenses for attending and presenting at other conferences. She says, "I've presented at one or two this year and three the year before that. Last year, it was the same presentation three times about 'Digital Breakouts' using Microsoft OneNote." She shares some of her Sway presentations as artifacts she created for these conferences, including one titled, "Escape the Ordinary: Using Digital Breakouts to Engage Students." She also mentions that her school was selected as a "Microsoft Showcase School" around the same time she received her first MIEE recognition and they hosted an event where she presented. Additionally, she describes how she had the opportunity to attend an event in Seattle where she visited the Microsoft headquarters for a tour and information session, which was paid for by the company.

Besides presenting at conferences, Michelle is the head of her school's technology committee and she is required to provide professional development for teachers at least once per year. She discusses how this "gives her anxiety" because "teachers are terrible students." She elaborates further on how it can feel like she has to "bang this technology into people's heads as opposed to presenting at conferences where everyone shows up eager and they want to learn something new." As a result of these experiences, Michelle would prefer not to move into a coaching role. Instead, she is enjoying designing her own curriculum based on what her principal has identified as needs for the school in her 1:1 iPad lab.

Moreover, Michelle explains how this is her fourth year as a MIEE and she has to re-

apply each year to be considered again. In addition to submitting a new artifact with every application, she says:

> You're also supposed to train other teachers. So it's kind of an "each one, teach one" motto. You have to submit your hours and then you're encouraged to take some of the *Microsoft* courses to keep fresh. You have to show evidence of the badges or recognitions that you've earned...I am a bad student and usually at the end of the year, I just go and take a bunch of tests so that I'll have more badges and when I re-apply, I can show that I've been learning new things.

Michelle continues to maintain her *MIEE* designation because she feels it is important for her professional growth.

Summary. Each participant discussed various learning pathways they have taken and how these have shaped (or continue to shape) their professional identities. These trajectories have included presenting at conferences, publishing educational content or resources, co-teaching, coaching, pursuing other titles, continuing their education, etc. Several artifacts were shared such as: presentations, videos, podcasts, lesson plans, online courses, and various resources that were made publicly available to other educators. Jennifer and Angela specifically created multiple iTunesU courses and collaborated with Apple on ways they were using their products in education. Meanwhile, Sarah helped to develop Minecraft lessons in collaboration with Microsoft. Jennifer, Angela, and Jared have even taken on consultant work with the technology vendors.

All six teachers mentioned initially joining the programs for support and guidance with new technology, although their participation led them into mentoring roles within their schools and districts as well. They also discussed tensions they have experienced because of taking on additional responsibilities. One thing several participants described is the need to "log or report" the activities they are doing to support the vendors, which can be difficult to keep up with when teaching full-time. As a result of these tensions (and others), Angela recounts how her active

involvement led to burnout and an outbound trajectory when she removed herself from the programs because she was no longer able to spend enough time in her classroom. Similarly, Keiko questioned what her next steps should be because her engagement appears to be declining. She is considering presenting more outside of her state or potentially applying into another program. It appears that the programs may need to address these tensions to better support full time teachers.

Unlike the ADEs and *Google Certified Innovator*s who were required to attend an in-person institute or academy upon earning their titles, both Sarah and Michelle discussed how they had not yet participated in an official *Microsoft Summit*. Instead, they have utilized special travel grants to attend and present at other big technology conferences. Another unique aspect of the MIEE program is the fact that Sarah and Michelle have to re-apply each year to maintain their titles and status. This provides further insight into the differences of each program.

Theme 4- Identity as a nexus of multi-membership: comparing identities as educators in schools and participants in the programs. Identity is formed across boundaries. Practice connects to "broader constellations" and it remains important to understand the relationships between the local and global contexts (Wenger, 1998, p. 162).

Keiko (P1). At the school where Keiko teaches, there is a division between the upper and lower grades with technology products that are used. In kindergarten and first grade, the students have iPads and in second through fourth grade, they have Chromebooks, although they are moving toward implementing Google tablets. As a result of this, teachers are doing different things with the devices and Keiko is not as connected with those who are not using iPads. She also sees herself as someone who is excited to keep learning and giving her students new tools to use in the classroom. Keiko explains how she has often asked herself, "Am I the only one?" and

through this experience, she has found other ADEs who felt the same way. She says:

> When those amazing people (referring to other ADEs) are saying the same thing, then maybe I'm on the right track...I found more people like me outside of the classroom or school and that was really helpful. It's just a really different dynamic. People there are all alike in a way because we all took a risk to put ourselves out there and just want more or to keep changing, progressing, and learning.

Keiko discusses how most of the teachers at her school do not really know she is an *Apple* Distinguished Educator or what this title means. She describes how her principal asked if she wanted him to email everyone about her recognition, and she did not think it was necessary. She explains, "it's truly for our own professional development...it's not that I kept this a secret, it's just that we are not using Apple school-wide." She also believes the program is not for everybody, but she is grateful for the experience to find other educators like herself to share ideas with and to grow professionally in her practice.

Jennifer (P2). When comparing her experiences in both the *Google Teacher Academy* and *Apple Distinguished Educator Institute*, Jennifer explains:

> I think the two programs are great. I think a lot of it is time and situation...So if you were to talk to me right after doing the *Google Teacher Academy*, I was over the moon. It was so great and I still I would do it again, both, I mean...but I just think from a long term perspective, like who's doing it better, Apple has totally hit the nail on the head in terms of having a really rich community. There are people there that are *Apple Distinguished Educator*s and they're retired and they're still active in the community. They were like the first teachers to have the old Macs—the big ones in their classrooms so there's a little bit of a history there. I think they're very personable and they really do they have a better sense of community. To me, that's what's missing from the *Google Innovator* program, even today.

As a result of these experiences and her direct observations, Jennifer feels like Apple is more of a tight-knit community than Google.

Additionally, Jennifer reflects on her experiences outside of these programs as a teacher. She says, "People think I'm kind of a geek at work, but it's true…" She explains how many of her

colleagues do not fully understand what these titles may mean and why someone would pursue them. Jennifer elaborates further on how she believes participation in these programs requires a "growth mindset," where teachers are eager to keep learning and growing professionally:

> I always feel like you have two different kinds of mindsets around professional learning. You have teachers with a very fixed mindset who say, "I'm only going to learn what I have to learn—the curriculum that's in front of me so I can teach and then go home" and then you have the teachers with a growth mindset who say, "How else can I teach this? I have a curriculum and I have all of these teacher manuals which are great, but my kids aren't engaged and they're not really learning, so what else is out there?" I think that's what both of these communities endorse—more of a growth mindset. A big part of being in them is that you have to be willing to make mistakes in front of these people, ask questions, and be a learner...If you aren't and you always pretend you're the expert, then one day you're not going to be the expert anyway because technology is moving so fast.

Jennifer also uses the analogy of being a "chef" versus a "cook" in the classroom and she describes how she sees herself compared with other teachers:

> I see myself as a chef. I never teach the same lesson twice in the exact same way because I'm always trying to do it better. It might have worked well, but I can always see an area of improvement...Where you definitely can have a cook who always preps food the same way. I think people in these communities are chefs. They are always looking to do better and improve. It's important that we have educators who are more like chefs... When you see some of the stories and people presenting about what they're doing around the world, it's absolutely amazing...Whether they are working with Apple or Google products, they're making a difference with the technology and it's truly inspiring.

Angela (P3). Angela's primary focus has always been on her students and one of the conflicts she faced as a result of her multi-membership in these communities was the loss of time spent in the classroom because of her dedication to presenting about supporting learning with technology. She reiterates, "I was all over the place and it's very tough when you have two young children and you're still teaching full time." She also describes how some of the teachers she tried to inspire were not always receptive to change or interested in learning new strategies:

> There were some teachers who would say "Ugh why do I need to learn this?" They just despised it and this broke my heart, but if you can just keep sharing the positives, some of them would run with it while others would just choose not to. Teachers have to put their time in it...I think teachers have very little prep time and if they do, it's for stuff in the classroom— but not really for their own learning.

Ultimately, Angela made the decision to take a step back from participating in the programs so she could dedicate her time to teaching and her personal life as a mom of two children (see Theme 3- *Identity as a learning trajectory* for further details on her departure). Angela says her only regret is the fact that she "quit cold turkey" without giving her colleagues and other members of her network any explanation and she feels bad about that. Nonetheless, she is happy to continue inspiring her students and integrating technology as a teaching tool.

Angela also discusses how she never felt "as well versed with Google as she was with Apple," even though she earned titles in both of their programs:

> I'm better at it now—five years later... but at the time, I had a MacBook and I was putting everything into Apple. I wanted to learn more at Google, so I was glad I got in, but I was just not as blown away as how I was with Apple. I put more of my eggs into the "Apple basket" after the *Google Teacher Academy*. Of course, I still kept the title—I worked hard to get it, but I wasn't doing as much as I was with Apple and also I don't teach with Chromebooks—I teach with iPads.

Additionally, she explains how since participating in these programs, she became a Book Creator Ambassador and earned her Master Teacher badge for Epic, which are two of the latest technology applications for literacy instruction. She truly believes in these applications and thinks they are amazing tools for her students. Angela says she joined their smaller communities to continue learning about the newest things happening with their development, although she has minimal involvement and still does not participate in social media.

Jared (P4). Jared describes how there are now four Google Innovators in his school district, which includes himself and his previous administrator, but he explains how the program is not for everyone:

> I don't think it (referring to the Google Innovator program) is necessarily for your average person… I think all teachers want to change the world, but there is a difference between changing the world inside your classroom and then trying to change the world on a larger scale…I feel like that can be kind of intimidating for a lot of people. I mean it's intimidating, even for me, but I don't think everybody is willing to put themselves out there like that and that's not a bad thing... It's just not for everybody.

He also discusses how many of the teachers he works with have no idea what the program really is or what the title means. He believes school districts may look at it and evaluate teachers on some level, but otherwise it really is not a big deal to have in that regard.

Despite this, Jared appreciates participating in the program to network and share ideas with others outside of his school and district. He says he is really enjoying trying out new technology tools in his kindergarten classroom. Jared describes how he intentionally requested to teach kindergarten this year because many teachers argue that it is the most challenging grade level to integrate technology with since students have so many other skills (i.e. socializing, beginning to hold writing utensils, forming letters, counting with hands on manipulatives, etc.) to learn when they are brand new to school. He saw this as a challenge for his professional growth and in a sense uses his classroom as a "laboratory" to explore what students are capable of with regard to technology. Accordingly, he will continue to stand out as a role model for other teachers and he likes having the opportunity to mentor or coach from a distance, even though this is no longer his official job title.

Sarah (P5). In addition to her role as an MIEE, Sarah is also a *Minecraft Global Mentor* and *Microsoft Surface Master Trainer.* She explains how she feels less connected with the larger

MIE Expert groups than she does with the Minecraft one and hopes to develop better relationships with other educators in these programs.

> I talk with the Minecraft team the most because we have a bigger conversation going on even though we're a smaller group. The *MIE Expert* group has been asking, "how can we coordinate smaller groups by having regional groups?" They want to have that smaller community discussion, but there are still participants who just listen to the call—if that and they don't really share out or mentor other teachers.

Sarah elaborates further on how she is extremely active in the Minecraft community and she describes her collaboration with other mentors:

> With the Minecraft group, I've collaborated on a couple of different projects with other mentors designing lessons, sharing ideas…Sometimes it's answering questions or "Hey, I have this idea. What are your thoughts?" Sometimes it's actually working directly with the Minecraft team. Some of us who are really active are constantly trying to figure out what is best and how we should organize this group so it's more effective.

She also explains how they all have Minecraft Education Edition accounts so they can "actually be in the same worlds and collaborate with each other even across worlds."

Additionally, Sarah reflects on how she is different from other teachers in the school where she works because she sees herself as an "early adopter of technology" with a passion for continuously learning. She describes how teachers must have the desire to dedicate time to their professional learning and participating in these communities:

> If you're trying to integrate technology into a school, you can't just give a teacher a bunch of iPads or Chromebooks, or in this case a bunch of resources and opportunities to connect with others, unless they understand the value, they're comfortable, and they have a desire to be a part of that community. That's because it does take more time and teachers' time is something that they have to be very careful of how they're using… It matters whether you believe it's valuable to spend time on your growth as an educator. If you don't see the value in that, it's not going to have a meaningful impact on your ability to educate, on your own growth, or on the growth of others around you.

Michelle (P6). Since Michelle has consistently demonstrated passion for learning and integrating new technologies in her classes, she was selected by her principal to set up a new 1:1 iPad lab in the school. She explains more about her position and how she was given this unique opportunity:

> This is a new position to my school. It is only the second year that they've had this position and they're kind of cropping up all around my county. There was an iPad lab in another school—kind of a spin on the traditional computer lab. My principal heard about it and then went to visit it and she said, "Oh, I'd love to do that at my school." I also visited the same lab and was like, "Oh, I would love to do this." So when it got back to me that our principal was interested in having that type of position at her school, I approached her saying, "Hey, do you want that kind of classroom? I want to teach in that kind of classroom!" So, we had that conversation and she did whatever she had to do on an administrative level to get it approved.

As a result of teaching in the new iPad lab, Michelle has not been as actively involved with using Microsoft products and participating in the MIEE community as she was in previous years. She seems to be at a crossroads because of her new position and the current tools she has access to. Despite this, she mentions how she feels compelled to keep applying for the *MIE Expert* title each year, even though she may be moving into a new direction now:

> At this point, I feel like I need to keep getting it because I've had it all these years. There's a little bit of that push, which is conflicting— especially for me personally since I don't use Microsoft tools now nearly as much as I would have anticipated or would like to because there are a lot of limitations by having all the iPads. If I had more access to Microsoft tools, that probably would be another motivation to participate more.

Michelle elaborates on how she is less confident about getting selected again saying, "I didn't think I was going to get picked this year because I have all iPads and I had to really cut back on my Microsoft use." When asked if Michelle has considered pursuing the *Apple Distinguished Educator* program since she is now working with iPads more, she says she has all of her "*Apple Teacher*" badges, but hasn't decided if she will apply for the next level. Michelle

additionally describes how other teachers in her school are not as motivated as she is when it comes to pursuing these titles and earning badges. She believes that if Microsoft offered even more travel grants and funding for conferences, more teachers may be interested in participating. She acknowledges that teachers are "underpaid and under-recognized," so they need tangible learning opportunities— more than "just a title that they can add to their Twitter account." Michelle feels she has been able to grow professionally as a result of her participation, but she does wish the company could support more teachers financially.

Summary. All participants discussed their work as full time classroom teachers and how it connects or disconnects with their experiences as *Apple Distinguished Educators*, *Google Certified Innovators,* and *Microsoft Innovative Educator Experts.* They described seeking further support from the vendor-sponsored programs because of their continuous desire to learn and address challenges faced with integrating technology in their schools. Throughout their interview responses, they shared about how their multi-membership across community boundaries impacts their professional identities and overall growth. Their stories included descriptions of tensions they have experienced as a result of division in their roles. They also explained how other teachers and administrators in their schools or districts are often not even aware of what these titles mean.

Keiko mentioned feeling less connected to other educators at her school, while Jennifer said she feels like "kind of a geek" compared with her colleagues. Sarah similarly discussed how she stands out as a highly motivated "early adopter," which often leads to mentoring others even though she still considers herself a new teacher. Likewise, Jared describes how he believes it remains important to be a role model for others and he concludes that these programs are not necessarily for all teachers because of their specific requirements. Jennifer and Angela

additionally compared their experiences between the ADE and Google Innovator programs, since they are members of both. They discuss benefits and tensions of participating in more than one community. Meanwhile, Michelle is now working more with iPads than Microsoft devices and expresses how she feels compelled to keep reapplying to maintain her MIEE title even though she might be better suited for the ADE program at this point in her career. All of the teachers' accounts reveal that it can be challenging to maintain multi-membership across communities.

Theme 5- Identity as a relation between local and global contexts: how educators define themselves through their participation and what they see as meaningful. Practice connects to "broader constellations" and it remains important to understand the relationships between the local and global contexts (Wenger, 1998, p. 162). Besides focusing on what participation means within the programs, all interviewees discuss how they are growing as professionals, which includes skills and relationships they have developed.

Keiko (P1). Keiko discusses how she feels her participation has impacted her professional growth:

> As a professional, you just get really inspired by people who are putting themselves out there. When I'm teaching in a small town in a first grade classroom, the world is so small and I get kind of tired from day-to-day things. Then when I look up this gal that I met through the *ADE* program, who flew to China and gave this great presentation to the Chinese teachers about how to integrate coding…(she's at the college level, but still…) when I hear that kind of stuff, I know people are doing great things and they're all out there not so far from us...It's a great inspiration.

She says she has truly come to recognize that, "it's not about the technology tools or products—it's about having an innovative mindset and focusing on students' learning." She elaborates further, stating:

> Technology changes pretty rapidly, so we have to keep up. I think we must be willing to learn more, be open to changes, and stay excited about technology. While some researchers say things against technology, we should try to see both

> sides (the positive and negative) and focus on the big picture, which is kids learning—that has to be the center... If we consider students' learning as the main goal, technology can support that...Whenever I see a new app, I think about how can I use it in the classroom and if it will really be helpful.

Keiko explains how she integrates technology in her classroom by introducing a few tools at a time and giving students' choices on what they want to learn with. She says:

> I don't give a ton of tools to the kids because I don't want them to be overwhelmed. I want them to focus on a few and learn how to use them well. Once they are proficient with the tools, then their focus shifts to the content they are learning...This year, I really pushed it. I did a "tech boot camp" day in September and I showed them a lot of different tools to use like: Scratch Junior Stop Motion Animation, Green Screen, Keynote, Clips, and Flip Grid… I demonstrated what the apps could do, then allowed them to explore and play for a while. After that, we did specific projects as a class so they would learn additional tricks and go deeper with the tools. Then, I released students to reading and math stations and gave them a choice for how they wanted to create and then publish on SeeSaw.

She describes how students also learn to write block coding in addition to creating stories, animations, and movies. She even makes recordings of herself for students to listen to on their headsets because she finds this is a more effective way for them to follow instructions and repeat certain steps if necessary. Keiko acknowledges that some kids may not enjoy the technology as much as others, but her goal is to introduce them to a variety of tools so they are empowered to make choices about what works best for them.

Jennifer (P2). Based on these interactions and experiences, Jennifer discusses how she feels her participation has impacted her professional growth*:*

> I come back from these conferences so energized and so passionate about teaching and learning...You get so energized and you're like, "If I can just do this one thing, then it's you know it's going to make a difference in one kid's life… right?" It's going to get them to have some self-confidence or it's going to get them to think differently about themselves as a learner and become more of an expert learner.

Jennifer admits that she uses Apple products more in the current school where she is working, so this has impacted her continued investment in the Apple program. She elaborates:

> I think if you were to talk to somebody who's maybe at a school with Chromebooks and they lived and breathed Google, you might hear a different experience. For me, it's really just about what you're using and what makes sense. I think over time you're like, "Where am I going to invest my time and where am I getting really amazing ideas for what I'm doing every single day?" Even from a STEM perspective, Apple developed Swift Coding and they're producing content for me to use that's spot on with what I do in my daily instruction with students…I want to concentrate on one, so I've been really just focusing on Apple because I feel like it really encompasses so many things.

She also discusses introducing her students to multiple tools whether they are Apple or Google and allowing them to pick what works best for them:

> If I find a student likes to use Google Slides vs. Keynote for presentations, it doesn't matter to me. They should get to choose that. I will show them a variety of tools, but in the end I want them to select what they are comfortable with. I think it's more important to look at a task and determine what fits the needs of the students or to let them choose depending on their age and skills.

Angela (P3). Angela discusses how she feels her participation has impacted her professional growth:

> I felt like a lot of people helped me so, I had to pay it forward. I enjoyed inspiring people. I loved going to schools, speaking to them, and getting them fired up—and this was back when no one had even touched an iPad. I was speaking with teachers anywhere from 25 years old all the way up to 70 years old and I wanted to help inspire them to be fired up about learning and willing to put the time in.

She describes how she just got to a point where she had "given enough" and was "finished in that role." In reflecting on her experience, she says:

> I appreciate the journey and boy did I have a good time. I loved all the people that I met, but I was ready to move on and close that chapter... I'm really glad that I did it and don't regret it. I think it was a great learning experience, especially when trying to figure out how to be an innovative teacher using Apple and Google products… I definitely felt honored when I was welcomed into that very "elite group of educators." I may no longer be participating on a global scale by connecting, presenting, and doing all of that stuff, but I still put time in, read tech magazines, learn what I can, and try to be on the cutting edge with what's going

> on with education. I just feel like more locally, I've put my energy into my classroom—where before I was stretched so thin.

Angela additionally mentions how she feels a responsibility to utilize the iPads in her classroom while supporting families in understanding how important they are for students' learning:

> Districts invest a lot of money to get iPads in every child's hands and with that, I feel a responsibility to do everything I possibly can to be the best teacher and not have them (referring to the iPads) just sit on a shelf. I've often asked myself, "What can I do to elevate my teaching?" and I think it is my responsibility to taxpayers, parents, and most importantly to my students… Not only do we have to change the mindset of educators and how we're teaching, but now we need to support our families with this tech and help them to evolve with us.

She elaborates further on how through this experience, it became "second nature to be so tech savvy." She explains how she learned to think differently about teaching with technology:

> When you teach with iPads 1:1, you're drastically changing how you teach and how you think. I don't just want to give students an iPad like a "digital workbook." I want them to be creative, innovative thinkers, and to think outside of the box... I have a whole different mindset about this now.

Jared (P4). Jared describes how he feels his participation has impacted his professional growth:

> I guess as egotistical as it sounds, it definitely felt good to be honored or recognized. Although, I don't feel like now that I have my *Google Innovator* title, I'm getting a million more calls like, "Hey Jared, you're a *Google Innovator*! Would you come do PD for us? It's mostly like "Hey Jared, you're back in the classroom... You're a kindergarten teacher...We'd love to have you come work with our kindergarten teachers." So, I don't know how in that way it did a whole lot for me. I do however think learning about the design thinking process has been helpful for me and thinking about my students' design thinking or about adding designing in my lessons has been a benefit.

Jared also discusses how earning the *Google Certified Innovator* title inspires him to lead others and be a positive role model for supporting students' learning:

> Overall, I feel like in having this role it's implied that you should be a champion of your causes. I also feel like if I'm going to carry this role, "How am I sharing it

> with people?" I definitely hold myself to a higher standard…I think it's about helping to change the education system so we can make it better for kids. It's important to make learning more engaging and to give kids more real world skills.

Sarah (P5). Sarah discusses how she feels her participation has impacted her professional growth:

> I've grown a lot in how I think about education and mentoring others. My understanding of professional growth being about mindset came from my discussions with other participants in the communities... In the *Minecraft Global Mentor* group, someone may post a simple question like, "How do you assess in Minecraft?" and that's a starting point for considering a bunch of different things such as, "How important is it to be assessed in game?" or "How often should we be pulling things outside of game?" When you start getting into those more philosophical questions, you learn a lot—one in just different ways you can assess in Minecraft, but really it's affected my own design of lessons and gets me to be a lot more purposeful. I think there's a lot of growth when you're discussing those types of things with educators outside of your own environment because you can get very stuck in designing the same way—if you aren't reaching out to other schools and hearing ideas from another perspective that you haven't thought of.

She elaborates further on how as a mentor, she has learned to communicate differently and to model strategies for other teachers while encouraging them to try things when they are comfortable so that they can feel successful. She mentions how growth can happen when, "a strong mentor engages on a global level, then brings all of their learning to a local level—whether that's within their district, school, or even with just their team of teachers." She feels it is extremely important to share ideas and help teachers feel supported, especially as an "early adopter of technology," who wants to influence others to explore new tools.

Sarah concludes that Microsoft benefits from having teachers participate in these programs because more people including students can learn about their technology products. She emphasizes how, "ultimately the focus should be on how technology impacts students and gives them a voice so they're empowered to take ownership of their learning...That's what matters most."

Michelle (P6). Michelle discusses how she feels her participation has impacted her professional growth and she describes how she appreciates getting inspiration and support from other educators. She says:

> You have a community of people that will encourage you or push you. For instance, there was this kindergarten teacher and she was using OneNote notebooks with her students. It had not dawned on me to try this with such young students and I was like, "oh ok… maybe kindergarteners can create a digital OneNote and navigate that." So, you can get inspired by seeing what other people are doing and sharing.

Michelle explains how she has learned to introduce different Microsoft tools to her students including PowerPoint, Sway, and OneNote, in addition to showing them Apple tools such as Keynote and Clips, so they can develop their own presentations, movies, and various projects. She also demonstrates how they can use other technology applications for creativity such as Microsoft Photos, Pic Collage, and she hopes to eventually incorporate Green Screen. Ultimately, Michelle believes that it is important to focus on helping students navigate between all of the tools out there and decide which they prefer for learning.

Summary. All teachers described feeling inspired from their interactions with other participants in the programs and growing professionally from their experiences. They offered insight into how the earned titles influence their teaching and mentoring practices outside of the program communities, emphasizing that their participation has ultimately been about integrating technology to support students' learning. Keiko, Jennifer, and Michelle discussed introducing students to a variety of technology tools and empowering them to make choices. Meanwhile, Angela explained how she feels it is her turn to "pay it forward," while Jared similarly describes holding himself to a higher standard as a mentor and role model to others. He also emphasizes the importance of teaching real-world skills and helping to change the education system to make it better for kids. Angela additionally reiterates that teachers need to think differently about how

they teach with technology. Moreover, they all mentioned appreciating the recognition, but advocated that it is not just about the technology, but instead about mindset and being open to change. Their biggest takeaway has been getting new ideas to support students and surrounding themselves with others who share this passion for continuously improving education.

Innovative methods for professional learning. All interviewees described unique aspects of the technology vendor-sponsored programs and how they differ from traditional professional development opportunities in schools. The following themes emerged across their responses: (a) *learning continues through online collaboration, in-person meet-ups, or alumni events,* and (b) *participants have direct interaction with technology vendors' product developers and opportunities to pilot new products*. Two sub-themes that additionally came up among most but not all participants include: (a) *intimate conference* and (b) *funding opportunities*, which will be discussed in further detail.

Theme 1- Learning continues through online collaboration, in-person meet-ups, and alumni events. Participants discussed how they have opportunities to collaborate online in addition to meeting in person for local social activities, alumni events, or when attending/presenting at education technology conferences. This allows them to stay connected while maintaining an active membership in the program communities.

Keiko (P1). With regard to collaborating online, Keiko says, "there is an ADE website where people blog, put questions, or we are also kind of required to log our activities, but I'm not really good with logging. Other than that, it's really up to us how we stay connected through Twitter, Facebook, or just texting." Keiko mentions that she has also volunteered at other technology conferences such as the International Society for Technology in Education (ISTE) with fellow ADEs in the "Apple Playground," which additionally allows her to stay connected,

but she has not yet participated in any alumni events. She attributes this to being busy with teaching and says she appreciates having all of the opportunities to keep learning with other ADEs across multiple platforms, which she has not experienced in traditional professional development settings.

Jennifer (P2). Jennifer participates in both the Apple and Google online communities notes differences between them. She begins by explaining how Google has project component for reporting on what you have been working on:

> Google's community is more of like a thread— an email thread and they do have a portal now, but that that's just been in the last two to three years. The portal is a space to report on your project and what you're doing so you can keep your designation, which is kind of strange to me. There's this expectation, that you're working on projects and reporting—they call it 'reporting.' I'm a *Google Certified Trainer* as well, so there's a little bit of that same portal... I have access to both designations for Google. You can report on your "Innovator project" and then you can report on your training sessions if you're a trainer.

Meanwhile, she describes how the ADE community is focused on connecting with others and it has places to share ideas and ask questions:

> Apple's online community is more about a personal learning network and you can connect with people. It's little bit more robust in just like the function and what you can do in there. It has a journal section to share what you're doing, but there's no forced accountability if you don't journal or blog. They have a way for you to post a question and then people can respond.

Jennifer explains how she prefers the format Apple is providing in their online community, but she still thinks both programs are finding creative ways to keep educators connected where it's not just "sit and get all the time" in a traditional professional development format. She also shares about ADE Alumni events that she has participated in:

> They always run an event once a year, and you still have to apply or just put your name in the hat to go and a lot of it is to just like rejuvenate your ideas, connect with people, and sometimes you present if you want to share an idea like a cool project or something that you did…I've been to all of the alumni events. So I did one in California, Germany, and another one just this summer in Texas. They do

> more global events in terms of their *Apple Distinguished Educator Institute*... Apple will run their intake classes by country, so they have one event in North America, an event for Europe, and an event for Asia.

She also describes how she tried to attend a Google Innovator meet-up event at the ISTE Conference when she returned to the United States, but there were over 400 people there and she felt there was no personal connection. In her opinion, the program has gotten so big and she questions if the criteria to get in has changed, thus lowering the bar and overall rigor. She would like to see Google bring participants back from the original *Google Teacher Academies* to interact more with those in the Google Innovator program because she personally does not feel as connected.

Angela (P3). Angela discusses collaborating with other ADEs and *Google Innovators* mostly through social media, but mentions how they also have online communities and she has worked with other educators on projects after attending in-person institutes or academies. She explains how she first attended the *Apple Distinguished Educator Institute* in Austin, Texas:

> The *Apple Distinguished Educator Institute* was just truly amazing. It was five days long in Austin, Texas. We had our own hotel and we took over it. We had security guards all around us everywhere we went. We were treated very well there and we got to see the newest things going on with Apple. We would have to put down all devices, they would share things, and one of the best parts is they would highlight and showcase what other teachers were doing. The teachers at the same table as me would go up and share their stories and it was very professionally done. Overall, it was very classy, inspiring, and made you want to strive to be better as an educator while using Apple products. That was probably one of the best takeaways from it.

The following weekend, Angela flew to Chicago, Illinois to attend the *Google Teacher Academy.* She mentions reconnecting with three people who were at the *ADE Institute* when attending the *Google Teacher Academy* and compares her experiences:

> So that was drastically different...It was a two-day event and we were there for eight hours a day. That was the week following my Apple experience and I was just blown away with what they did at Apple. I was not so much with what they

> did at Google... I don't know, there was just a "classiness," an awe-inspiring passion, and a true belief on what they were doing that I got from Apple. The *Google Teacher Academy* was good, but it was just kind of piecemealed a little bit to me.

Angela also describes participating in alumni events with other ADEs:

> There was a 20-year anniversary celebration for ADEs held in Southern California and we went to all the different state parks. Every day they took us somewhere new including going down to the ocean. We all had iPads and we would hook up the microscope function thing to the iPad. We looked at microorganisms, we went hiking, we learned about photography, and about creative ways the iPad could be used. I only did two of those...

She explains how it was powerful to participate in events that allowed for continuous learning, especially since "most traditional professional development does not include a follow-up to discuss what's working or not working." She believes it is extremely "helpful if educators come together and talk about technology more to support one another over time," which both programs allow opportunities for.

Jared (P4). Jared explains how in addition to collaborating with other *Google Innovators* across online spaces, which includes participating in Google Hangouts, Google Groups, and Twitter, he also joins in-person meet-ups at larger conferences such as CUE and ISTE to reconnect with others. He says:

> Once you get it (referring to the Google Innovator title), you can stay connected with people through the meet-ups... They have what's called the 'energizer' and sometimes at larger events like ISTE or CUE, they (referring to Google) give you chances to connect.

He describes how he has met people he may not have encountered otherwise. He says, "just connecting with people from different places broadens your PLN and then all of a sudden you gain other connections through them." Jared expresses that the benefits of participating in the *Google Innovator* program have been meeting new people, sharing ideas, and continuing the

learning across multiple spaces, which is drastically different from traditional professional development he has experienced in schools.

Sarah (P5). Sarah describes how *MIE Expert*s utilize a Microsoft OneNote Notebook in addition to GroupMe and Slack for collaboration:

> So we have the OneNote Notebook, which is our main big communication and then we use GroupMe. There is an overall *MIE Expert*s Global, *MIE Experts* United States, and within that there are regional groups. I'm part of a GroupMe for both the Global and U.S. *MIE Expert*s, in addition to the Pacific Northwest Regional group. We have discussions that can range anywhere from coordinating a local meet-up to just sharing exciting things that are going on in the classroom… There probably are around anywhere from 4 to 30 messages a day. We also started a Slack channel last year and moved to teams. We have a ton of organizational chat groups from: mentors helping mentors to language arts lesson designs, and then all the subjects, primary grades, middle grades, high school and university, etc. So we have a bunch of different discussion feeds along with tech help and a Minecraft one...There are at least 20 channels with different conversations going on.

She explains how there are also opportunities to participate in monthly *MIE Expert* Skype calls and local meet-ups at conferences:

> There are *MIE Expert* meet-ups during conferences so you can find each other… They are often lined up around different events, but I know they're trying to have a bigger push to get more collaboration happening locally. Additionally, the Minecraft Global Group has meet-ups around the world around for different conferences and we collaborate on teams a lot. We're constantly talking with each other…You have active members in the community and you have members that you never see, so you can choose to be a part of it or not.

Whenever Sarah is presenting at conferences, she joins the meet-ups and this allows her to receive continued support from other educators, which is more than what she receives at her school.

Michelle (P6). Michelle describes ways that MIEEs can connect online. She says, "There's a GroupMe chat for our local southeast region and then there's a larger U.S. chat and a

Facebook group...If you ask a question and put the hashtag #MIEExpert in Twitter, people will definitely respond." She shares how there are also optional monthly Skype calls:

> There are monthly calls and if you miss them, you can listen to the recording. I do try to catch those. They discuss anything big that Microsoft may have coming down the pipes and any regional conferences like if they have people presenting. They try and get people to volunteer at the booths they will have as a part of that conference. So we talk about what's coming up and they provide hashtags or visuals that you can use on social media to promote your session. Before "Skypeathon," they talked about that and then they'll cover other educational topics… So if the topic is literacy and Microsoft tools, then they might have some featured MIEEs who talk about what they're doing in their classroom or teaching environment and share what they have going on.

She explains how besides attending conferences, there are other social meet-ups where MIEEs are able to connect with one another:

> Outside of the conferences, it's kind of social activities. We've had a couple of in-person meet-ups including some at the Microsoft store to see new technologies and what they have to offer in terms of field trips. The first couple of meet-ups were pretty small— maybe 10 to 12 people. I've also attended dinners after big technology conferences here in my state where there were probably around 20-30 people. One of the *Microsoft Certified Trainers* in my district just retired, but she is kind of still the regional host for all the *MIE Expert*s in our area, so she facilitated our last face-to-face social meet-up back in November.

Michelle discusses how this makes her feel like she always has a network of educators to collaborate with, which is a unique aspect of the program that differs from traditional professional development opportunities.

Summary. All teachers discussed how learning continues through online collaboration, in-person meet-ups, and alumni events. This includes participating in online spaces via the programs' portals, backchannels such as: Slack, GroupMe, Google Groups, Microsoft One Notebook, and via social media platforms including Twitter. Jared, Sarah, and Michelle described joining virtual meet-ups through Skype or Google Hangouts, where they had

opportunities to exchange teaching ideas and learn about new technology products before they were released. They also mentioned attending in-person regional meet-ups to stay connected with other educators.

Additionally, Keiko and Jared described collaborating with other participants at large technology conferences such as ISTE and CUE and helping to volunteer at events sponsored by the technology vendors. Meanwhile, Jennifer and Angela discussed participating in alumni events to rejuvenate their ideas, share best practices, maintain relationships, and receive continuous support from other educators involved in the programs. They also compared and contrasted their experiences within the ADE and *Google Innovator* programs since they are members of both, explaining how they felt the *ADE Institute* and online space provides a rich community for collaboration with less emphasis on "reporting" their activities outside of the classroom. These opportunities have allowed teachers to maintain connections while continuously learning to improve their practice, which is especially beneficial when they do not always have access to the same people or resources within their local school sites.

Theme 2- Direct interaction with technology vendors' product developers and opportunities to pilot new products. All participants described being able to connect directly with the technology vendors from Apple, Google, and Microsoft at the in-person institutes or academies, education technology conferences, or within the program's private online community. They also discussed how these interactions have allowed them to learn about new products, potentially conduct beta-tests, and to give feedback based on their experiences.

Keiko (P1). Keiko attended the 2017 *Apple Distinguished Educator Institute* held in Austin, Texas for the United States recipients, which also included some of the alumni from previous years who applied to attend. She compares the *ADE Institute* to other educational

technology conferences that she has participated in such as ISTE:

> Other technology conferences…some are good, some are not—even ISTE. I have walked out of a few sessions before...It's so big and sometimes you can't get into the ones that you want to or you do and it wasn't what you were looking for. I didn't have that kind of disappointment at the institute. Everything was so high quality because we focused on the Apple products so much. I've never been to a conference like that. We got to listen to the creator of the Clips app—it's a newer version of iMovie. He presented a workshop and when you listen to the creator explaining how this app came to be and his thoughts behind creating all of these little icons here, a button there, it's just a mind-blowing thing.

She describes learning from the other ADE alumni through breakout sessions and collaborative opportunities:

> They had a lot of breakout sessions led by Apple or the ADE alumni who applied and were accepted. We did things as a whole group with keynote speakers, also ignite sessions (speakers are given like three minutes and they can only use so many slides to share what they're doing), breakout sessions, and then also we were able to get into our job areas. I was in a K-2 teacher group and we had to create a video with the Apple Clips app that had just come out.

Keiko also mentions that some ADEs are additionally involved in beta testing new products, although she has not personally done this because she doesn't see herself as that "technical."

Jennifer (P2). Jennifer describes how the *Apple Distinguished Educator Institute* is organized compared with her experience at the *Google Teacher Academy*:

> The people that are running the ADE *Institute* are people who work for Apple and you're meeting people that are on the Education Team including developers who actually develop the apps...So, you do have more of a direct relationship with Apple, whereas Google, you don't. I think it's more of a distant relationship...It's not as intimate in terms of like with the company...It was just a different at that time.

She further explains how she connects directly with Apple developers at the *ADE Institute*:

> I think with Apple when you go there, they're really interested in what you're doing, how you're using the tools. They're there to support you and sort of any sort of project that you're working on, or any sort of thing that you might need. I do feel that Apple takes your story and your instructional practice very seriously.

> So if you want something in a product or piece of software, especially around student accessibility, they will do that for you. I mean, they really will move mountains. They will introduce you to the developer. You can show them something like, "Hey, I want it to be able to do this...I'm doing it for this reason, so students can do this." They have changed products and things that I've suggested.

Meanwhile, Jennifer believes that Google subcontracts out other people to organize the academy and they center it "on design thinking, which is less tool or product focused." In her opinion, they (referring to the company) are not necessarily into "building relationships with you and trying to find how the products are working and getting feedback." She says that they "cherry pick people to do that, but it's not part of the conference at all." As she compares her experiences across both technology vendor programs, she says:

> Apple is in it to make technology work for the classroom and teacher. I can't speak to Google because I feel like they might do that, but they do it behind closed doors and then they kind of release something like, "Oh, we've done this with this person," like when they released, Google Classroom, which is an amazing product... they don't do that with their Innovators, they tend to just go out and work with a school and it's not part of this experience at all.

Jennifer also explains how she feels she gets the "inside scoop" as a participant in both programs:

> So you might hear about something being released a little earlier, the general public and you just have to say, I'm not going to go tweet it out to the world… Things are run very tight-knit in terms of all the legalities and you basically sign all this stuff (referring to nondisclosure agreement forms). I learn about things way before they go public sometimes and they want to give us time to sift through things and maybe test things out... I don't necessarily get access early, but I might hear about a possible new feature.

Angela (P3). Angela explains how she connected with some of the Google application developers including the person who created the "Doctopus" application and other G Suite add-ons. She also discusses "seeing the newest things going on with *Apple*" product developers and says:

> One thing I really liked when I would go to these events is that I would sit with the developers of Keynote, iBooks, and iTunes...the people that are writing the software for Apple and I would tell them what works, what doesn't work, and they would listen in a non-judgmental way. They would ask me to share more of what I'm talking about, why it doesn't work, and what the kids think. I always thought that was pretty cool. I also took a class with Apple on Keynote that was led by the creators and I was just blown away. I mean, I couldn't even keep up. At some point… 15 minutes into them showing stuff, I just had to watch because I was 20-steps behind. I learned all about the "instant-alpha" feature and I love that. I mean, truly what Keynote can do! It really is an underrated application for students to use. Digital storytelling was something else that I learned a lot about with iMovie.

Jared (P4). Jared similarly discusses how he has been able to learn about new releases and give feedback. He says, "you sign a nondisclosure, so there are certain things like webinars that you can check out about early releases and you definitely get insight or information before it comes out to the general public…They even might ask you for feedback on certain products." He describes how he also had an opportunity to visit the Google headquarters, which was a unique experience that would never happen in traditional professional development. He elaborates further on how it was incredible to see firsthand what the company is all about and what their design space looks like. He explains, "we hear about these amazing spaces that they're trying to create but then you actually get to go and experience them...you see something that you maybe have never seen before and you think about, well, how can I apply that in my classroom?"

***Sarah* (P5).** Sarah discusses how Microsoft sends out communication asking for input on products. She mentions receiving invitations from the company asking, "Does anyone want to give feedback on this?" and she describes how it allows participants to "share their voices about products they are using everyday." Sarah really appreciates these opportunities and explains, "I've seen how things that we discuss are addressed... they're really listening." Sarah also mentions beta-testing products with the *Microsoft Minecraft Team*:

> I also work with a Minecraft team. They'll send out betas to us early that we can implement in our classrooms. We are then able to give feedback on things before they're officially released. Around the world, we were all demo testing and providing feedback... If we ran into a bug, we would send that or even if something's not working the way we would expect it to, there's direct access to people on the team who can help troubleshoot or update the code if it needs to be fixed.

She discusses the advantages of beta-testing and working directly with vendors:

> The team actually came in and observed our students using it in my Computer Science class. I was able to harness that experience of having the team there and my students were designing a game in Minecraft. They used the same survey style that the Minecraft team had to create their own user experience survey. They were designing the game for younger students, so they did their own research and we tied that back to what they were learning. That was a fun thing we got to do and having them (referring to the *Microsoft Minecraft Team)* on campus a lot is definitely an advantage.

She elaborates further on the positive impact this has on her students:

> We have a lot of people and developers coming in talking with the kids, so they actually get to see how their voice makes an impact...The Microsoft OneNote team will come and they'll (referring to her students) make suggestions. The Minecraft team will come and down the line, they (referring to her students) see their suggestions actually made into the products they use every day.

Michelle (P6). Michelle discusses how she has had opportunities to pilot and beta-test new Microsoft products:

> I never know if it's because I am a *MIE Expert* or because we are a Microsoft district, but we've done a lot of piloting and beta-testing. I was invited to participate in a pilot for Paint 3D, but I had to borrow laptops to do it in my classroom since I now run the 1:1 iPad lab. Minecraft has also come to our school district in the past few months, but I actually declined participation because of the iPads. I mean, I can do it, but other teachers aren't necessarily generous with sharing their technology all of the time.

She also explains how she has participated in "MIEE Showcases," where she was able to learn more about new products and how to integrate them in the classroom:

> The very first time that I saw the Microsoft Digital OneNote Notebook Breakout was when Microsoft had a "*MIE Expert* and Showcase School Leader Summit," at one of the major conferences. This is where they invite the MIEEs in a

> particular area or region to come out to an event the day before a conference that they're going to be at and they have this showcase to tell you what's going on, show you the new products, give you some inside scoop, and offer a chance for you to share any feedback. So at one of showcases was the very first time I learned about a new way of teaching with the tools. I had just gotten a "physical BreakoutEDU box" and I loved having the kids run all around the library unlocking locks, but then I learned about how to incorporate it online, and that was even better.

Additionally, Michelle describes how the MIEE Showcases have allowed her to learn more about Microsoft's sustainable goals:

> The showcases were part of the way that they taught us about Microsoft's sustainable goals. Our trainer actually modeled how to effectively use the tools... It wasn't just like, "Microsoft has this new thing called...and this is what it does." Instead, she would say, "Look at this great new way to show data" and then she would teach us how to create it or whatever. I think they do a lot of "show what you know," where they are modeling best practices in a meaningful kind of way, whatever it is they're trying to show you that's new and happening.

Summary. All participants discussed having direct interaction with technology vendors' product developers and opportunities to pilot new products. In fact, several teachers discussed needing to sign nondisclosure agreements in order to participate in the programs because they were given early access to information about new products or features being released. Angela, Jennifer, Jared, Sarah, and Michelle specifically described learning about new products before they went public and being able to conduct pilot or beta-tests so they could give feedback to the technology vendors. Additionally, Keiko, Jennifer, and Angela described how they met product developers and attended keynote or ignite sessions led by them to better understand how the products could be used in their classrooms. Keiko and Jennifer focused on their interactions with Apple developers, their Education Team, and other ADE alumni at the institute, where they felt like their input was valued. Jennifer explained how suggestions she made were taken into consideration with Apple products. Angela described similar experiences with both the ADE and Google Innovator program, discussing how she also provided feedback to the vendors and felt

like their input was valued. Jennifer explained how suggestions she made were taken into consideration with Apple products. Angela described similar experiences with both the ADE and Google Innovator program, discussing how she also provided feedback to the vendors and felt supported by their developers.

Meanwhile, Sarah said she receives communication from Microsoft with surveys asking for input on products and she has even had the Minecraft Team visit her classroom to observe students and listen to their suggestions. Moreover, Jared mentioned being able to visit the Google Headquarters as part of his experience in the academy and likewise, Michelle went to the Microsoft Headquarters for an information session. All participants felt like these were unique and inspiring opportunities that would not occur in traditional professional development settings. They mentioned learning more about the products because the institutes or academies included hands-on sessions where they could explore the new technologies further and directly ask experts questions. They also discussed providing personalized suggestions for technology vendors and their product developers aligned with the needs of students and other teachers.

Sub-Themes

Intimate conference. A sub-theme that came up among the interviewees who participated in the *Apple Distinguished Educator Institute* or the *Google Innovator Academy* (previously referred to as *Google Teacher Academy*) was how these in-person gatherings were small and intimate compared with other conferences for professional learning that are much larger in size. They discuss how this allowed them to easily make connections and build relationships with other teacher participants. Several also describe their participation in these events as similar to becoming part of a "class, cohort, fraternity, or family of like-minded colleagues" to learn and grow with.

Funding opportunities. Five out of six participants (Keiko, Angela, Jared, Sarah, Michelle) additionally mentioned how there were opportunities for grants, scholarships, or other funding to attend and present at conferences. Some described covering their own travel arrangements for the in-person institutes or academies, while the companies would pay for the rest of their expenses including all meals. One participant, Angela even mentioned getting her airline ticket reimbursed by the vendor when she was asked to present for them. Accordingly, participants described how this made it easier for them to get involved, especially because expenses were not always covered by their school districts. They also felt like this helped to support their professional learning trajectories since they were encouraged to attend other education technology related conferences and share about their work in the programs.

Chapter Summary

This chapter presented the study findings with a descriptive analysis of participants' experiences in the technology vendor-sponsored programs. Core themes included: professional identity and innovative methods for professional learning. Wenger's five dimensions of identity were used as a framework to organize the professional identity themes into the following categories: (a) *Identity as the negotiated experience of self:* Defining what the earned titles mean, (b) *Community membership:* Connecting with other educators, (c) *Identity as a learning trajectory:* Applying new skills learned within and outside of the classroom, (d) *Identity as a nexus of multi-membership:* Comparing identities as educators in schools and participants in the programs, (d) *Identity as a relation between local and global contexts:* How educators define themselves through their participation and what they see as meaningful. Additionally, innovative methods for professional learning were organized into the following categories: (a *learning continues through online collaboration, in-person meet-ups, or alumni events,* and (b)

participants have direct interaction with technology vendors' product developers and opportunities to pilot new products. Sub-themes that were also mentioned include: (a) *intimate conference* and (b) *funding opportunities*. Chapter five will discuss what these themes revealed as related to the literature review and elaborate further on how the phenomena was not entirely the same depending on programs interviewees participated in.

Chapter Five: Discussion

This phenomenological study focused on the lived experiences of educators who have earned titles (e.g. *Apple Distinguished Educator, Google Certified Innovator,* and *Microsoft Innovative Educator Expert)* and participated in vendor-sponsored professional development programs, specifically exploring how their professional identities changed as a result of their experiences. The research was conducted via semi-structured interviews with six participants (two educators from each program) in order to gain an in-depth understanding of the phenomenon from their individual stories. The results provide further insight into why educators were motivated to acquire new statuses and participate in these programs, what it means to have such titles, how they are being used within or outside of the teaching practice, and how educators believe this contributes to their professional identity. Additionally, the results provide further insight into how these technology-vendor sponsored programs work, what participation in them entails, and what specific innovative professional development methods are being implemented that educators describe as beneficial for their professional growth. Chapter five discusses: key findings as they connect to the theoretical framework and literature, contributions and limitations of the study, implications for practice, recommendations for future research, and conclusions.

Restatement of the Research Question

This investigation was guided by the following research central research question: *What are the lived experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?*

Discussion of Key Findings and Interpretations

A transcendental phenomenological reduction process resulted in the identification of two core themes generated from the data, which include professional identity and innovative methods

for professional learning. While these were organized into specific categories and sub-themes, there were several key findings that occurred across them. These findings are discussed in further details below.

Professional Identity

Wenger (1998) depicts five dimensions of identity, which were used as a framework for organizing the professional identity themes into the following categories: (a) *Identity as the negotiated experience of self:* Defining what the earned titles mean, (b) *Community membership:* Connecting with other educators, (c) *Identity as a learning trajectory:* Applying new skills learned within and outside of the classroom, (d) *Identity as a nexus of multi-membership:* Comparing identities as educators in schools and participants in the programs, (e) *Identity as a relation between local and global contexts:* How educators define themselves through their participation and what they see as meaningful. Within and across each of these five dimensions of identity, the following key findings were revealed:

- Participants valued collaborating to share ideas or expertise and saw this as critical in their professional identity formation.
- Participants discussed connecting with other educators through the online communities provided within the technology vendor-sponsored programs in addition to utilizing social media platforms such as Twitter for continuous professional development and networking opportunities.
- Participants were highly motivated and they described aspects of having a "growth mindset" (Dweck, 2006) for themselves as important for their professional learning trajectories.

- Participants strongly advocated that technology integration should be student-centered with less emphasis on the tools (technology) and a primary focus on supporting learning.
- Participants indicated that there are some tensions with staying actively engaged in these programs and balancing teaching responsibilities.
- Participants discussed how there are few full time classroom teachers (at least in the elementary level) currently participating in these programs because many of them have moved into leadership roles as coaches, instructional technologists, or administrators.

Value in collaboration. Throughout this study, participants emphasized the importance of networking and building connections with other educators. They appreciated having a supportive community of fellow practitioners to collaborate with on projects, ask questions, share ideas or expertise, and offer feedback. Many of the participants discussed developing meaningful relationships while meeting at in-person institutes and academies, educational conferences, or even across online spaces. Jennifer (P2) mentioned, "the educators that were there (referring to the *Google Teacher Academy*) really shared a lot of best practice about what was happening in the field. I came home with so many ideas and I felt like the learning kept going after we left...I'm still in contact with a lot of people that I met."

Participants described their professional identities and membership into the program communities as becoming part of a "class, cohort, fraternity, or family." Their relationships were viewed as a primary source of motivation and have allowed participants to grow professionally while learning from one another. This is evident when Angela (P3) explained, "you have an emotional attachment...you become friends with these people...I felt much more comfortable

with them than a lot of people that I work with... We're very like-minded and passionate about certain things." Michelle (P6) similarly stated, "you have a community of people that will encourage you or push you...You can get inspired by seeing what other people are doing and sharing." Moreover, Jared said, "I stay connected to them more than my average educator friends." He also discusses why sharing ideas is important to him stating, "when I share a lot and I try to contribute, I think people value that collaboration and help. It's kind of a culture you can be a part of."

Participants additionally mentioned how connecting with other "like-minded" educators provided a level of sustained support that was not necessarily available at their schools. This is best understood when Keiko (P1) explained how she has often asked, "am I the only one?" until she found more people like herself outside of her school. She emphasized how, "people there are all alike in a way because we all took a risk to put ourselves out there and just want more or to keep changing, progressing, and learning." Sarah (P5) similarly discussed how she joined to "be part of the community" and to see what other educators outside of her school were doing. Findings align with the literature reviewed in Chapter two, which emphasizes that teachers are invaluable resources to one another as learners, especially when they share expertise and helpful strategies about the practice in meaningful ways that deepen their learning (Butler et al., 2004; Darling-Hammond et al., 2017; Desimone & Garet, 2015; DuFour, 2011; Hord, 2015; Lieberman & Miller, 2016; Mclaughlin & Talbert, 2006; Vescio et al., 2008). Findings also substantiate other studies conducted about teachers' motivation to share knowledge for reasons such as: combating isolation, providing emotional support, experiencing a sense of camaraderie, improving the welfare of community members, exploring new ideas, improving their practice, etc. (Hew & Hara, 2007; Hur & Brush, 2009; Macià & García, 2016).

Another topic several participants discussed was being mentored by other alumni in the programs and receiving guidance on how to bring new technologies into their schools. Two of the participants, Jennifer (P2) and Angela (P3) described leading a 1:1 iPad initiative when Apple first released them with the guidance of other teachers in these programs. Meanwhile, Sarah (P5) still sees herself as a new teacher and mentioned how "a lot of the people in these communities are much more experienced," but they have helped her to develop skills with Minecraft and modeled how she can use it as a teaching tool within her lessons. Now she is mentoring teachers at her school and she has collaborated with teachers online to support their learning. These findings reinforce the benefits of using peer coaching as a strategy for supporting teachers with technology integration (Barron et al., 2009; Beglau et al., 2011; Bradshaw, 2002; Browne & Ritchie, 1991; Freeman et al., 2017; Garmston, 1987; Glazer & Hannafin, 2006, 2008; Holland, 2001; Kopcha, 2012).

Online communities and social media platforms for professional learning. As Beach (2012) advocates, "teachers can capitalize on the affordances of digital tools and social networking capabilities to collaborate, plan with, and learn from other teachers in their own school, as well as teachers in other schools across the country" (p. 256). This is something all participants in the study described as important in their experiences. Many of them discussed learning about the programs sponsored by technology vendors from following other educators on Twitter. They also explained how Twitter was used to ask or answer educational questions, tweet about presentations and other artifacts they developed for conferences, and to build their professional learning networks (PLNs). Additionally, participants described how each program has an online community where teachers can maintain connections, learn about new technology releases, find resources, and report about projects they were working on. Collectively,

participants viewed the online communities and other social media platforms as beneficial for collaborative purposes and they felt this was critical for their professional growth.

These findings align with other studies conducted about teachers using social networking sites for professional purposes (Bill & Melinda Gates Foundation, 2014; Corcoran, & Quattrocchi, 2014; Grunwald Associates LLC & Digital Promise, 2015). They also support findings in related literature about Twitter being utilized for ongoing teacher interaction because it offers flexibility and personalized learning opportunities (Trust, 2012, 2016). What is especially powerful is how the teachers in this study are using online spaces including Twitter to connect with others globally and collaborate on projects in order to support one another with their endeavors. As other researchers have advocated, online spaces offer teachers choices on the time, location, contents, and pathway for learning with opportunities to collaborate across geographic boundaries (Beach, 2017; Carpenter et al., 2016; Hew & Hara, 2007; Hur & Brush, 2009; Jones & Dexter, 2014; Little & Housand, 2011). Moreover, this study shows how participants in these programs are gaining and contributing to a significantly larger pool of expertise than what may be available to them locally, which is similar to how knowledge is exchanged across affinity spaces (Beach, 2017; Booth, 2012; Carpenter et al., 2016; Gee, 2004, 2012; Riel & Polin, 2004; Schlager et al., 2009; Schlager & Fusco, 2003; Trust, 2012, 2016; Warlick, 2009).

Highly motivated teachers. Jurasaite-Harbison and Rex (2013) explored what prompts teachers to learn informally. They found that teachers could be classified as "proactive or reactive learners" based on whether they intentionally set specific learning goals to accomplish or if they casually responded to problems or informal learning opportunities as they arose. Other researchers have also noted that a teacher's identity simultaneously influences their professional

goals and is how they make sense of themselves as teachers (Beijaard et al., 2002; Coldron & Smith, 1999). Moreover, several studies have shown a direct correlation between teachers' beliefs, dispositions, attitudes, or prior experience and how technology is integrated in their classrooms (Ertmer, 2005; Ertmer et al., 1999; Ertmer & Ottenbreit-Leftwich, 2010, 2013; Kim et al., 2013; Kopcha, 2012; O'Neal et al., 2017; Tondeur et al., 2017; Vannatta & Fordham, 2004). In this study, teachers easily fit into the "proactive learners" category because they were highly motivated to apply and participate in the programs sponsored by technology-vendors. As a matter of fact, many described themselves or the ideal candidates for these programs as having a "growth mindset" (Dweck, 2006). Jennifer (P2) discussed this in depth, stating:

> I always feel like you have two different kinds of mindsets around professional learning. You have teachers with a very fixed mindset who say, "I'm only going to learn what I have to learn—the curriculum that's in front of me so I can teach and then go home" and then you have the teachers with a growth mindset who say, "How else can I teach this? I have a curriculum and I have all of these teacher manuals which are great, but my kids aren't engaged and they're not really learning, so what else is out there?" I think that's what both of these communities endorse—more of a growth mindset. A big part of being in them is that you have to be willing to make mistakes in front of these people, ask questions, and be a learner…

Likewise, Sarah (P3) explained how she feels the need to "constantly be learning." She stated that teachers who want to participate must have a "growth mindset because technology is constantly changing and in the programs you learn about the new technologies quickly." She also referred to herself as an "early adopter" of technology (Rogers, 2003). Meanwhile, Michelle (P6) used the term "self-starter" to describe the type of teacher that she thinks is best suited for these programs because they are ambitious to learn new things.

Based on their commentary, these are phrases participants have learned from other professional development opportunities that they feel fit with their identities. Although this is an internal aspect of identity, which differs from the social aspect of identity, it has a direct

correlation with how teachers determine their professional learning trajectories as participants in communities of practice. It is this passion for continuous growth and exploration with innovative technologies that inspires them to apply, earn prestigious titles, and become members of these unique programs. As Wenger (1998) describes, "identity is becoming" and this "work is ongoing and pervasive" (p. 162).

All participants in the study also explained that they have mentored other teachers in some capacity and presented at conferences to support technology integration in schools. Some have even helped to pilot and deploy new devices (i.e. iPads or Chromebooks) when they were first released, while others have developed their own curriculum or even pursued consultant work with the technology vendors. Additionally, five out of six participants had a master's degree with the exception of Sarah (P3), who is newer to the profession and mentioned enrolling in a program in the next year or two as one of her goals. Furthermore, several of the teachers discussed how a large portion of the other participants they interact with in these programs are no longer in the classroom and have moved into leadership roles as coaches, technology integrationists, administrators, higher education faculty, etc. This confirms that most participants are highly motivated to continue learning and growing as professionals.

Student-centered focus. As previously mentioned, Ertmer (2005) describes technology integration as "facilitating uses of technology that lead to increased student learning" (p. 28). The Intel Teach Program (2011) similarly defines technology integration as "the process of teachers and students routinely and seamlessly using technology resources and technology-based practices to enhance learning" (p.2). Perhaps one of the most prevalent findings in this study was that all participants discussed maintaining a student-centered focus when integrating technology and they also provided artifacts with evidence of this occurring in their classrooms. Keiko (P1)

said she has truly come to recognize that, “it's not about the technology tools or products—it’s about having an innovative mindset and focusing on students’ learning.” Angela (P3) also explained, “When you teach with iPads 1:1, you’re drastically changing how you teach and how you think. I don't just want to give students an iPad like a ‘digital workbook.’ I want them to be creative, innovative thinkers, and to think outside of the box.” Likewise, Sarah (P5) mentioned, “ultimately, the focus should be on how technology impacts students and gives them a voice so they're empowered to take ownership of their learning...that's what matters most.” Meanwhile, Jennifer (P2) and Michelle (P6) described introducing their students to a variety of technology tools and allowing them to choose what works best for them. Jared (P4) also discussed wanting to be a positive role model for supporting students’ learning:

> Overall, I feel like in having this role it's implied that you should be a champion of your causes. I also feel like if I'm going to carry this role, “How am I sharing it with people?” I definitely hold myself to a higher standard…I think it's about helping to change the education system so we can make it better for kids. It’s important to make learning more engaging and to give kids more real world skills.

These findings align with what many researchers have advocated, that our focus should not be on the technology itself, but on how it can be used as a tool for learning with sound pedagogical practices (Culp et al., 1999; Dwyer, 1994; Ertmer, 2005; Liu et al., 2017; U.S. Department of Education, 2016; Zhao, 2003). Participants in this study equally emphasized that their instructional beliefs and practices align with pedagogies which foster students’ creativity, critical thinking, and 21st century skills. They also affirmed that the primary reason they were motivated to apply and participate in the technology vendor-sponsored programs was to continue learning about ways to be better teachers with technology and how to best support their students.

Based on participants’ descriptions of the programs, it is unclear whether the vendors are directly promoting a student-centered approach or if it is the teachers who are bringing their

knowledge of learning theories into practice when developing their skills with the new technologies. In their accounts, some aspects of the institutes or academies could be interpreted as "technocentric" (Papert, 1987), although participants also mentioned having experiences where vendors' developers made changes to products based on their input so that they would better support students' learning.

Tensions. Findings revealed that all participants occasionally experienced tensions as full time teachers and members in the program communities. Angela (P3) shared about getting burned out from being so involved in the programs that she felt it was taking away from her teaching. Keiko (P1) also mentioned how she is starting to feel less engaged and she rarely has time to "log activities" or share about what she is doing in the *ADE* online community, which she believes is a form of accountability. She also questioned what her next level of learning should entail:

> Where is a happy place? I feel like when I was getting into the *ADE* program, this would be the next level for me, but once you're in, you begin to question what's out there again. So then from here, where do you go? What's the next step? Do we go out more and present outside of our own state?

Likewise, Jennifer (P2) discussed how the *Google Certified Innovator program* has a project component for "reporting" on what members have been working on. She stated the, "Google portal is a space to report on your project and what you're doing so you can keep your designation, which is kind of strange to me. There's this expectation, that you're working on projects and reporting." This really seemed to bother her and because of this, she explained how she felt the *Apple Distinguished Educator* program has more of a "rich community" that promotes collaboration and idea sharing. Sarah (P5) also mentioned being required to post on Twitter about what she presents at conferences and how this can serve more than one purpose:

> Social media is a big part of all of these groups. Even when I go to a conference, my requirement is that I have five tweets a day with the #MicrosoftEducation hashtag attached to be constantly sharing out and that's kind of on the side… These programs are very beneficial to us and they're also beneficial to Microsoft. I definitely acknowledge that it goes both ways,

Meanwhile, Jared (P4) has been working extremely hard on his *Google Innovator* project, which he described as "not something you just kind of do for a year and you're done... it's a big chunk of your life, so you have to be very committed to do it." Throughout some of his interview responses, he questioned what it really means to earn the *Google Certified Innovator* title. He discussed how when he was selected, people in his PLN said, "Oh, I thought you were one already" and how this made him wonder why educators need these badges or titles. He referred to them as "almost like a stamp of approval," but he admitted that it means a lot to earn the recognition and to get acknowledgment from his colleagues. He additionally stated:

> I don't feel like now that I have my *Google Innovator* title, I'm getting a million more calls like, "Hey Jared, you're a *Google Innovator*! Would you come do PD for us? It's mostly like "Hey Jared, you're back in the classroom... You're a kindergarten teacher...We'd love to have you come work with our kindergarten teachers." So, I don't know how in that way it did a whole lot for me.

Michelle (P6) also describes a different type of tension when she explains how she feels compelled to keep applying for the *MIE Expert* title each year, even though she is now primarily using Apple products in her 1:1 iPad lab:

> At this point, I feel like I need to keep getting it because I've had it all these years. There's a little bit of that push, which is conflicting— especially for me personally since I don't use Microsoft tools now nearly as much as I would have anticipated or would like to because there are a lot of limitations by having all the iPads. If I had more access to Microsoft tools, that probably would be another motivation to participate more.

Since these teachers are highly motivated, they are constantly creating artifacts, developing and publishing curriculum, presenting at conferences, sharing about their work with the technology products on social media, "logging or reporting" activities and projects, and

related activities; the technology vendors expect a great deal from them and the teachers do not want to disappoint them. Is the certification a fair compensation for the teachers? Answering this question is outside the scope of this study, but it is important to note and ask since all participants discussed experiencing similar tensions. Further research is necessary to see if this is occurring with other teachers who have earned titles and participated in these programs. Additionally, follow up studies with participants in specific roles as TOSAs (Teachers on Special Assignment) or technology coaches may provide an alternate perspective since these positions entail different responsibilities and more time may be built into their work schedules for mentoring other teachers, developing curriculum, presenting at conferences, etc.

Coaches, Instructional Technologists, and Administrators. Upon searching for participants who met the study criteria, the researcher found that there were a limited number of elementary teachers who earned titles in the programs and were still teaching in the classroom full time. This was observed when reviewing the public databases of participants and confirmed as several participants discussed interacting more frequently with coaches and instructional technologists in the programs. They did however describe branching off into smaller work groups during the institutes or academies so they could specifically collaborate with other teachers in their positions, but they explained how classroom teachers were limited in number. Additionally, two of the six participants were previously coaches and had just recently moved out of their coaching roles and back into teaching again, otherwise they would have not met the study criteria. This finding suggests that many educators who earn these titles have professional learning trajectories that are moving them outside of the classroom and into leadership roles. It may even help to explain why several of the teachers in this study experienced tensions as participants in the programs because they were also committed to

teaching full time and balancing responsibilities such as: developing and implementing lesson plans, assessing students, conducting parent/teacher conferences, and performing other school duties.

Innovative Methods for Professional Learning

The second core theme was organized into two categories: (1) *learning continues through online collaboration, in-person meet-ups, or alumni events* and (2) *participants have direct interaction with technology vendors' product developers and opportunities to pilot new products*. Although this theme was not as prevalent in the interviews, all participants described the programs as authentic, relevant, and collaborative. Participants discussed being able to connect with other educators and share resources across multiple spaces, which included utilizing the programs' online communities and other platforms such as: Twitter, Facebook, Google Groups, Google Hangouts, GroupMe, Skype, Slack, and Microsoft OneNote Notebooks. Additionally, they participated in several meet-ups within their regions, at new institutes, academies, or educational conferences, and through alumni events. Participants' accounts provide evidence that the programs encompass social and situated learning opportunities that extend beyond isolated workshops. They also appear to align with Darling-Hammond and colleagues' (2017) findings, which advocate how effective professional development should: (a) be content focused, (b) incorporate active learning, (c) support collaboration, (d) use models of effective practice, (e) provide coaching and expert support, (f) offer feedback and reflection, and (g) continue over a sustained duration (p. v-vi).

Another innovative method for professional learning that participants mentioned was being able to connect directly with the technology vendors' product developers from Apple, Google, and Microsoft. Several participants discussed how these interactions have allowed them

to learn about new products, conduct beta-tests, and to give feedback based on their experiences. In her interview, Jennifer (P2) explained:

> Apple takes your story and your instructional practice very seriously. So if you want something in a product or piece of software, especially around student accessibility, they will do that for you. I mean, they really will move mountains. They will introduce you to the developer. You can show them something like, "Hey, I want it to be able to do this...I'm doing it for this reason, so students can do this." They have changed products and things that I've suggested.

Meanwhile, Sarah (P5) described how Microsoft developers have visited her classroom to speak with students about specific products and how the students were able to "see how their voice makes an impact." Other participants also mentioned interacting directly with product developers at the programs' institutes or academies. Keiko (P1) explained how she was inspired after attending a presentation led by the Apple developer of the new Clips application, stating, "when you listen to the creator explaining how this app came to be and his thoughts behind creating all of these little icons here, a button there, it's just a mind blowing thing." Similarly, Angela (P3) discussed in detail how she appreciated learning directly from the Apple developers:

> One thing I really liked when I would go to these events is that I would sit with the developers of *Keynote, iBooks*, and *iTunes*...the people that are writing the software for Apple and I would tell them what works, what doesn't work, and they would listen in a non-judgmental way. They would ask me to share more of what I'm talking about, why it doesn't work, and what the kids think. I always thought that was pretty cool. I also took a class with Apple on Keynote that was led by the creators and I was just blown away. I mean, I couldn't even keep up. At some point… 15 minutes into them showing stuff, I just had to watch because I was 20-steps behind. I learned all about the "instant-alpha" feature and I love that. I mean, truly what Keynote can do! It really is an underrated application for students to use. Digital storytelling was something else that I learned a lot about with iMovie.

Based on the stories of participants' experiences, it appears that the programs are providing personalized learning and coaching from product developers to increase educators' technology skills while additionally seeking input on their products. These findings align with

other researchers' recommendations for effective professional development with technology integration, which include giving teachers opportunities for: (a) observing models of integrated technology use, (b) hands-on practice, (c) collaborating and discussing evolving ideas with mentors and peers, and (d) reflection (Beglau et al., 2011; Ertmer, 1999, 2005; Hew & Brush, 2007; O'Neal et al., 2017). As Zhao (2003) advocates, "teachers need to be portrayed as designers and empowered to integrate technology within curriculum to promote learning instead of being constrained by the mechanical functions of technology" (p. 10). Apple, Google, and Microsoft product developers seem to value receiving feedback from teachers and students. According to teacher participants in this study, their concerns and suggestions have been used to improve products, which conceivably allows them to contribute as designers and focus more on how the tools can be used to support students' learning.

Research Contributions

Results from this study help to fill a gap in the literature concerning professional development programs sponsored by technology-vendors and what participation in them entails by providing first-hand accounts of classroom educators' experiences. Little research has focused on this phenomenon and results reveal how educators position their experiences relative to traditional district professional development opportunities. Several participants discussed being able to network and interact with other educators around the world, which is something they said they do not experience in traditional settings. They also felt like the in-person institutes or academies were more intimate and offered them a chance to share ideas, establish relationships, and continue the learning across online spaces. These findings support previous recommendations made for effective professional development, such as Desimone and Garet's (2015) suggested five key features: (a) focus on content and how students learn content, (b)

active learning opportunities, (c) coherence between content, goals, and activities with teachers' knowledge and beliefs in addition to the needs of students, (d) sustained duration, and (e) collective participation (p. 253). Many of these features are what participants in this study described as meaningful in their experiences.

Results also highlight the advantages of school and business partnerships to support professional learning by providing a better understanding of how these programs are structured and describing specific innovative strategies being implemented that can benefit the field of education. In addition to collaborating online or during in-person meet-up opportunities led by the technology vendors, participants described communicating directly with developers, beta-testing new products, and providing feedback based on their students' needs. Some even mentioned receiving funding to attend or present at other educational conferences; both were highlighted as benefits of these partnerships. Educators' accounts additionally offer further insight into their attitudes, beliefs, and motivation for competitively applying into these programs and an understanding of their professional trajectories upon earning prestigious titles from them. Moreover, educators' authentic examples and the artifacts they shared illustrate the professional benefits they have gained; they have gained technology integration skills and have had experiences that have transformed their teaching and mentoring practices.

Limitations of the Study

The goal of this qualitative study was to better understand the lived experiences of K-6 classroom teachers who have earned titles and participated in technology vendor-sponsored programs. This study provides a rich narrative of contextualized results, although they are not transferable to other contexts; this is the nature of qualitative work. The researcher aimed to ensure trustworthiness by employing strategies such as: using a reflexive journal, conducting

member checking with participants, and cross-checking data analysis procedures with the dissertation chair, although there may still be elements of bias present in the study. Another limitation is that only a small sample of K-6 teachers were purposefully selected who met the study criteria and the researcher may not have reached saturation. Single-subject credentialed teachers working in middle or high schools, TOSAs, technology coaches, school administrators, and higher education faculty members may offer differing perspectives that would impact findings presented in this study.'

Furthermore, it is important to note that teachers described some aspects of their experiences different depending on the program. For instance, the *Google Certified Innovator*s had to complete an "Innovation Project" centered on aspects of design thinking, which was unique to this particular program. Meanwhile, the two *Microsoft Innovative Educator Expert*s discussed being offered travel grants to attend educational conferences led by third parties, although they had not participated in institutes or academies held directly by Microsoft. They also described needing to reapply each year to maintain their status as MIEEs, whereas this was not a requirement for the *Apple Distinguished Educator*s and *Google Certified Innovators*. Since only two teachers from each program were targeted in this study, there is likely more to learn about other differences that exist and how educators' experiences vary as a result.

Implications

The data collected in this study provides a narrative of the experiences shared by the K-6 teachers interviewed who earned prestigious titles and participated in technology-vendor sponsored programs. These findings provide further insight into this phenomenon and have several implications for teachers, school and district administrators, and technology vendors that may help to improve professional development for effective technology integration.

For teachers. There were many benefits discussed from participating in technology vendor-sponsored programs including opportunities for collaboration with other teachers and access to resources for learning about specific products and how to integrate them in the classroom. It is important that teachers have a better understanding of how these programs may help to improve their practice and how they can provide a community for sustained support with technology. Teachers should also be aware that there are differing levels of commitment that may be required for participation in these programs and this must be carefully balanced with other teaching responsibilities so that it does not lead to tension or burn out. Many participants in the study described attending and presenting at professional conferences, developing curricular materials, posting on social media, and sharing other resources that took additional time out of their schedules and in many cases they were not compensated for these activities. Therefore, teachers must consider the pros and cons of these programs and determine how they can best suit their individual professional needs.

Additionally, participants in this study discussed how they use online spaces including social media platforms for professional learning. They described being able to connect with other educators in *communities of practice* (CoPs) and forming *professional learning networks* (PLNs), which allows them to easily ask questions and share expertise outside of their schools. They explained how this provides support and access to other resources that they may not have known about otherwise. They discussed how they also began exploring new mediums beyond traditional professional development offered by schools or districts such as Twitter and other online communities; this can provide another alternate avenue for teachers' learning and growth.

For school and district administrators. It is important to note that teachers in this study were all highly motivated to apply and participate in these programs. Although teachers said they were not directly seeking recognition, they all admitted to appreciating this because it is not frequently given in the profession. This demonstrates the impact of recognizing teachers for their dedication to continuous learning. School and district administrators should be aware of what these programs involve including the level of commitment and try to honor teachers who earn prestigious titles in them.

Secondly, school and district administrators should continue to explore other innovative methods of professional development including utilizing online spaces and social media platforms for collaborative opportunities. As participants in this study advocated, teachers need sustained support with technology integration and many of these innovative methods can help with this. Moreover, they should consider pursuing partnership opportunities with technology vendors and take advantage of free resources that may be available including grants or scholarships to support teachers in attending and presenting at educational conferences. School and district administrators may also benefit from encouraging specific teachers to apply into these programs and present about their experiences with other teachers to share best practices.

For technology vendors. Learning about what classroom teachers are taking away from experiences in these programs is valuable as technology vendors reflect on their impact in education. Participants in this study highlighted many benefits from joining the programs, although they mentioned that other teachers and school administrators are not always familiar with what earned titles in these programs mean or how participation works. Technology vendors may want to conduct further research that demonstrates how they are supporting teachers, Schools, and districts with technology integration so they can substantiate findings in this study.

They might also consider encouraging more school and district partnerships in addition to providing outreach opportunities to recruit other teachers who are not yet participating in these programs. This can potentially allow them to promote further buy-in from stakeholders while spreading their innovations on a larger scale.

Additionally, technology vendors may want to survey their participants annually—especially alumni to see if there are other things that they would like to learn about or experience, which would also help to keep them actively involved. The literature review conducted in this study confirms that many teachers still have difficulty with effective technology integration and often use technology to replace old teacher-centered practices rather than optimizing students' learning with constructivist methods. As a result, technology has not lived up to its potential of transforming education (Culp et al., 2003; Hew & Brush, 2007; Twining et al., 2013; Tondeur et al., 2017; U.S. Department of Education, 2016). Teachers need to move beyond basic proficiency levels with new technologies and learn more about how to successfully develop their own curricular materials that support critical thinking and 21st century skills. Although participants mentioned having access to some resources in the programs, they mostly described learning from interacting with other teachers and occasionally product developers. Therefore, it remains important to provide more research-based resources aligned with sound pedagogical practices that extend beyond "how-to-guides or pre-made lesson plans." This also includes moving away from "technocentric" (Papert, 1987) approaches that may be occurring in the institutes or academies and making direct connections to appropriate learning theories that are student-centered.

Furthermore, several participants in this study expressed how their engagement was declining because they felt like they were contributing more than they were necessarily gaining

in terms of professional development. For example, one teacher described getting burned out and how she stopped contributing altogether because she felt like it was taking away from her teaching. Consequently, technology vendors may need to provide more support and recommendations for how teachers can balance participation in the programs with other responsibilities in the profession or offer further incentives based on levels of commitment so that teachers do not feel like they are getting taken advantage of. They may alternately even consider adding a specific pathway for classroom teachers in the programs to accommodate for their other responsibilities.

Recommendations

For further research. The purpose of this qualitative phenomenological study was to understand the lived experiences of educators who have earned titles and participated in vendor-sponsored professional development programs. Based on the findings and core themes identified, there are several recommendations for further research, which can ideally be used to address gaps in the literature. Recommendations include: increasing the sample size, changing the criteria of the population, implementing a case study or multi-case study methodology, and potentially exploring alternate technology vendor-sponsored programs.

By increasing the number of participants, this would offer further insight into educators' experiences until saturation occurs. With more descriptive narratives to compare, findings presented in this study could be validated so that the phenomenon is better understood. Increasing the sample size would also ensure that participants' gender, cultural backgrounds, and geographic locations are represented consistently with the percentage of educators in these programs.

Additionally, researchers should examine the phenomenon further by changing the subject criteria to include different populations such as: middle or high school teachers, TOSAs (Teachers on Special Assignment), technology coaches, administrators, or even higher education faculty. This may allow for another perspective on participation in the programs because these populations have different responsibilities in their positions. Comparing populations can also validate whether the phenomenon experienced is the same or explain how and why they differ.

In the current study, the researcher observed that more than one phenomenon might be occurring within each technology vendor-sponsored program. Accordingly, future research with a case study or multi-case study methodology could contribute further to the literature by providing an in-depth understanding of the phenomenon under investigation. Individual case studies may offer more detailed descriptions of each program or conducting a multi-case study may lead to a better comparison of the programs and participants' experiences across them. Furthermore, exploring alternate technology vendor-sponsored programs besides the three presented in this study (Apple, Google, or Microsoft) may offer additional insight into this phenomenon.

A new vision for technology professional development. Results from this study indicate that when teachers, school districts, and technology vendors develop and maintain partnerships, they can potentially reap many benefits while learning from one another. As participants expressed in their interview responses, some of the benefits gained can include: in-person and online opportunities to collaborate with other educators who are passionate about technology integration, direct connections with vendors and their product developers and immediate access to a plethora of resources such as curriculum, funding for professional conferences, and to the chance to learn about new products being released or to conduct beta

tests. Districts can also reap these benefits when their teachers bring new ideas into the schools, lead new technology initiatives, mentor other teachers, and make recommendations for products. Meanwhile, technology vendors are able to promote their products while receiving feedback from teachers and their students, develop educational resources with the support of teachers, and to potentially sign contracts with school districts that wish to purchase their products. In this section, a new vision for professional development will be discussed to further outline benefits that may be gained for all stakeholders.

Starting with teachers, the ideal professional development program would offer further choices about what technology skills they wish to improve and what products they want to become more familiar with. A prestigious badging system led by vendors, with input and buy-in from schools/districts could be incorporated to document teachers' skills while building their confidence. While some schools already have badging systems, this one could be designed and built to address learning theories and other educational topics centered on technology integration with the products; this is not currently in the vendor programs, but is something that the teachers who are in the programs bring to the vendor programs. Using the vendors' resources, this system could help teachers get further recognition for their professional growth and contributions. With the badging system, there might also be ways for teachers to earn continuing education credit for the extra work they do with the vendors. Potentially, districts could put pressure on the vendors to provide opportunities for credit or extra pay on the behalf of their teachers who participate in the vendor programs to ensure that teachers' work for the vendors doesn't get to be too much in relation to their school responsibilities. In addition, if schools/districts were working in conjunction with the vendors and working to support teachers working with the vendors then selected teacher leaders who are interested in mentoring or coaching within schools on behalf of

the vendors could receive further district support. This might be an accommodation in their schedule or an adjustment to their contract to allow for more time to be spent outside of the classroom. This would allow the technology-expert teachers to help reach others who may not be as familiar with technology integration by modeling, planning and co-teaching lessons with them, conducting observations, and providing other methods for sustained support as teachers move into new learning levels.

In the ideas described above, districts would be using resources provided by vendors to revamp professional learning opportunities being offered in schools and build a larger network of educators who are passionate about sharing ideas for best practices. The districts would also represent their teachers' interests to ensure they weren't over-extended by the demands of the districts. Districts could discuss their vision with vendors based on the population of teachers and students they serve so that professional development can be aligned within the schools and be tailored to best support the district's needs. Vendors might offer products to districts at reduced prices so that more technology tools can be purchased for classrooms—especially in schools and districts not using the vendor's technology. This might encourage districts to consider partnering with multiple vendors so that teachers can find the best product for their needs. This would allow teachers to become more familiar with other technology tools and vendors to promote their products in districts who may have only been devoted to one.

Technology vendors would benefit from these partnerships because technology-expert teachers would have more opportunity to work with other teachers to help them learn. Since many of the teachers in this study mentioned how their colleagues were not always familiar with what it means to earn titles or participate in the programs, this could allow vendors to further penetrate schools with their products and influence technology integration on a larger scale.

Additionally, districts where they are successful would most likely help to connect vendors them to other districts, schools, and teachers.

Tensions to consider are that districts would need to determine how to ensure ethical decisions regarding product purchases and overseeing what data vendors are collecting and publishing. Additionally, they would need to protect teachers from being exploited and set boundaries with regard to how consultant work and other contributions impact their teaching or coaching responsibilities. The use of a badging system aligned with district visions might help with this since teachers could earn continuing education credit for their professional learning and contributions.

As districts and teachers became savvier, they could have multiple vendors partnering with them, which could create a situation where vendors might need to work harder to distinguish themselves and sell their products. Ultimately this healthy competition might lead to the development of better products and services for the schools. Vendors should not cover all expenses to expand a district's professional learning programs, but perhaps they could provide some initial funds as an investment for their access to teacher leaders and districts. The vendor companies should fairly compensate teacher leaders who help with consulting or training of other teachers, as the increased technology expertise will directly benefit them. Discussions should occur about what is fair since vendors get access to districts, a place to sell their products, and influence the next generation (students), and will most likely be getting further connections to the other school districts in order to sell their products and services.

Conclusions

This phenomenological study revealed more about the nature of educators' experiences after participating in vendor-sponsored professional development programs. Participants in this

study were driven by their motivation to competitively apply into the programs so they could explore new products and connect with other educators who are passionate about integrating technology as a tool for learning. They strongly advocated that technology integration should be student-centered with less emphasis on the tools and a primary focus on supporting learning.

Key findings showed that the teachers value the programs because they emphasize the importance of collaboration and sharing ideas or expertise. Findings also revealed that educators were highly motivated and they view these learning opportunities as critical in their identity formation. Teachers described the ideal participants of these programs as *self-starters* or *early adopters* with a "growth mindset," which closely resembled their own identity traits. They concluded that these programs may not be suitable for everyone.

This study builds on previous findings by validating what other researchers have argued is necessary for effective professional development with technology integration, which include: being relevant, meaningful, and interactive with hands on elements in addition to providing opportunities for collaboration and sustained support. Findings also confirm that teachers appreciate recognition for their skills and dedicated commitment to the profession. Furthermore, findings suggest that there may be several benefits gained from participation in the programs depending on educators' levels of commitment.

Although educators reflected on many positive aspects, several also indicated that there can be tensions with staying actively engaged in the programs and balancing teaching responsibilities, especially because there appear to be underlying expectations that educators are: creating artifacts, developing and publishing curriculum, presenting at conferences, sharing about their work with the technology products on social media, "logging or reporting" activities

and projects, and other activities. Hence, educators who wish to participate sometimes struggle to find a balance between their responsibilities within and outside of the classroom.

Closing Thoughts

This study addresses a gap in the literature by exploring the phenomenon of educators who have earned titles and participated in vendor-sponsored professional development programs designed to promote technology integration in their practice. Findings are significant because there is limited research about this phenomenon. Although it is not transferable to all contexts, this study provides a baseline of data about why teachers are applying to earn titles in vendor-sponsored programs, what participation in them looks like, how this translates to their teaching and mentoring practices, and overall how teachers feel this shapes their professional identities. Additionally, it provides better understanding of how these programs are structured and what innovative methods for professional learning they include.

Moreover, findings emphasize the need to conduct additional research on the phenomenon in order to investigate how an increased sample size and varying populations may provide further insight into educators' experiences. Studies may also be conducted on new models for technology professional development (i.e. the new vision presented in this chapter) in support of district and vendor partnerships that tailor learning to teachers' needs and comfort levels with technology. Researchers may additionally want to examine whether technology vendors are possibly exploiting teachers for their own benefit of selling products. While there is more work to be done in this field—especially so we can continue to better understand the phenomenon explored, this study validates that there are unique opportunities available for educators to improve their professional learning trajectories. As all participants indicated, technology integration should ultimately be about supporting students' learning while promoting

21st century skills that encourage creativity and critical thinking. This study provides hope and encouragement for a promising future in education.

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APPENDIX A

Definition of Terms

The following operational definitions will clarify terms and acronyms used in the course of this study:

- ***Affinity Spaces***- Informal physical and virtual learning environments where people are connected by a shared interest or endeavor (Gee, 2004)
- ***ADE***- Acronym for *Apple Distinguished Educator*, a title for recognition given to select teachers based on exceptional use of Apple products to transform teaching and learning (Apple Education, 2018)
- ***Apple Teacher***- A free, professional learning program designed to support teachers with their use of Apple products in education; Program participants are also referred to as *Apple Teacher*s upon earning all required badges for Mac or iPad (Apple Education, 2018; Apple Teacher at Your School, 2018)
- ***Cognitive Apprenticeship***- A professional learning model that relies on practical teaching methods, whereby context learning is key; Emphasizes modeling, coaching, and fading as strategies (Brown, Collins, & Duguid, 1980; Browne & Ritchie, 1991; Collins, Brown, & Newman, 1986)
- ***Collaborative Apprenticeship***- A professional learning model that features reciprocal interactions between peer-teachers and teacher-leaders; Comprised of four progressive phases: (a) introduction, (b) developmental, (c) proficient, and (d) mastery (Glazer & Hannafin, 2006, 2008; Glazer, Hannafin, & Song, 2005; Glazer, Hannafin, Polly, & Rich, 2009)

- ***CoP***- Acronym for a *Community of Practice*, a social learning system grounded in sociocultural theories of learning and development (Lave & Wenger, 1991; Wenger, 2000; Wenger & Trayner-Wenger, 2015)
- ***Connectivism***- A model for understanding learning, which occurs as individuals connect with others via networks across online spaces (Bell, 2011; Downes, 2008; Kop & Hill, 2008; Siemens, 2005, 2014; Siemens & Conole, 2011).
- ***Digital Badges***- Symbols, tokens, or icons that incentivize learning while demonstrating proficiency in specific skills (Ferdig, Pytash, Emery Nickerson II, & Smith, 2017; Gamrat et al., 2014; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2015; Mozilla Alliance for Excellent Education, 2014; Willis III, Flintoff, McGraw, 2016)
- ***Edcamp***- Peer-led, participant-driven professional learning opportunities for educators that use an *unconference* model to build teacher networks and share best practices (Carpenter & Linton, 2016; Swanson, 2014)
- ***Google Certified Educator***- A title for recognition given to teachers who have demonstrated a Level 1 and/or Level 2 proficiency with *Google* products in education by successfully earning the required certification (Google for Education, 2018)
- ***Google Certified Innovator***- A title for recognition given to select teachers based on exceptional use of *Google* products in education with a desire to help others transform classrooms with technology (Google for Education, 2018)
- ***Informal Learning***- Spontaneous, unstructured, or incidental learning that often takes place outside of traditional school settings (Coombs, 1985; Eraut, 2000; Livingstone, 2001; Marsick & Watkins, 1990, 2001; Schugurensky, 2000)

- ***Instructional Coaching***- A professional learning model with a job-embedded approach to instructional intervention that provides the assistance and encouragement necessary to implement school improvement programs; Focuses on the "Big Four," a framework built around the following aspects of teaching: 1. Classroom management, 2. Content planning, 3. Instruction, and 4. Assessment for learning (Knight, 2007, 2009)
- ***ISTE***- Acronym for the *International Society for Technology Education*, a nonprofit organization that serves educators interested in better use of technology in education
- **Mentor Teacher**- An experienced teacher who supports pre-service or new teachers and provides coaching, training, and feedback as needed to gain a better understanding of the practice (Cochran-Smith & Lytle, 1999; Darling-Hammond, 2009, 2010; Feiman-Nemser, 1996, 2001; Feiman-Nemser & Parker, 1993; Feiman-Nemser, Parker, & Zeichner, 1993; Little, 1990a)
- **Micro-credential**- Competency-based, on-demand, personalized, and shareable evidence of educators' learning and skills, which are more focused than diplomas, degrees, or certificates (Center for Teaching Quality & Digital Promise, 2016, 2017)
- ***MIE***- Acronym for *Microsoft Innovative Educator*, a title for recognition given to teachers who have earned 1,000 points in the *Microsoft Educator Community* by completing online training courses toward digital badges (Microsoft Educator Community, 2018)
- ***Microsoft Innovative Educator Expert***- A title for recognition given to select teachers based on exceptional use of Microsoft products in education (Microsoft Educator Community, 2018)

- ***NETP***- Acronym for the *National Education Technology Plan* (U.S. Department of Education, 1996, 2000b, 2004, 2010, 2016)
- ***NETS***- Acronym for the *National Education Technology Standards*, developed by the International Society for Technology in Education (ISTE, 2011, 2016, 2017)
- ***Networking***- Making connections with others through personal or professional relationships that involve the exchange of information via spontaneous and short-lived interactions (Brown & Duguid, 2001; Brown, Duguid, & Weinberger, 2017; Trust, 2012, 2016; Wasko & Faraq, 2005; Wenger et al., 2012)
- ***NoP-*** Acronym for *Network of Practice*, a type of informal, emergent social network that facilitates information exchange between individuals with practice-related goals (Brown & Duguid, 2001)
- ***Participatory Culture***- A culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices; Forms include: *affiliations, expressions, collaborative problem-solving*, and *circulations* (Jenkins, 2006, Jenkins, Ford, & Green, 2013; Jenkins, Katie, Purushotma, Robinson, & Weigel, 2006)
- ***Pedagogy***- The method and practice of teaching, especially as an academic subject or theoretical concept
- ***Pedagogical Content Knowledge***- The combination of knowledge about teaching (*pedagogy*) and subject expertise (*content knowledge*) to describe how knowledge is integrated when teaching in particular disciplines (Shulman, 1986)

- ***Peer-to-Peer***- File-sharing networks, where people distribute knowledge online in a multidirectional process (Schollmeier, 2001); A network of equals (peers) in which two or more individuals are able to spontaneously collaborate without necessarily needing central coordination (Schmidt, Geith, Hakley, & Thierstein, 2009)
- ***Peer Coaching***- A professional learning model where teachers form collegial partnerships in order to provide support, encouragement, and feedback to one another on their teaching practices (Showers, 1984; Showers & Joyce, 1996)
- ***PLC***- Acronym for *Professional Learning Community*, which is when school professionals come together as a group, in community, for the purpose of learning (Hord 1997, 2008); Educators creating an environment that fosters mutual cooperation, emotional support, and personal growth as they work together to achieve what they cannot accomplish alone (DuFour & Eaker, 1998)
- ***PLN***- Acronym for *Personal and Professional Learning Network*, a network of people and resources that support ongoing learning either personally or professionally (Flanigan, 2011; Ivanova, 2009; Lieberman, 1995, 2000; Tobin, 1998; Trust, 2012, 2016; Trust, Krutka, & Carpenter, 2016)
- ***Professional Development***- Specialized training, formal education, or advanced professional learning intended to help administrators, teachers, and other educators improve their professional knowledge, competence, skill, and effectiveness.
- ***Self-Directed Learning***- A process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating their learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles, 1975)

- ***Self-Efficacy***- One's belief in one's ability to succeed in specific situations or accomplish a task (Bandura, 1997)
- ***Social Learning***- Theory that learning occurs as existing conceptual knowledge is challenged and transformed through social and physical interaction with the environment (Bandura, 1977; Dewey, 1938; Bruner, 1990; Vygotsky, 1978)
- ***Situated Cognition***- Theory that all knowledge is embedded or situated in activity, including the social, cultural, and physical contexts in which it was learned (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991)
- ***Technical Coaching***- A professional learning model that involves guiding teachers through a process that begins with modeling implementation of instruction, providing opportunities for the teacher to practice, and then observing and administering feedback during implementation to promote fidelity (Garmston, 1987)
- ***Technology-*** Equipment or tools (i.e. hardware or software) that can be used to simplify tasks, to transmit information, improve communications with others, and/or to create new artifacts
- ***Technology Integration***- Facilitating uses of technology that lead to increased student learning (Ertmer 2005)
- ***Technology Vendors***- Companies that sell technology related products to schools and districts or to individual teachers and students
- ***TPACK*** – Acronym for *Technological Pedagogical Content Knowledge*, a framework describing the intersection of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK) as needed for optimal technology integration (Mishra & Koehler, 2005; Thompson & Mishra, 2007)

- ***Unconference***- a loosely structured conference emphasizing the informal exchange of information and ideas between participants, rather than following a conventionally structured program of events (Carpenter & Linton, 2016; Owen, 2008; Swanson, 2014)

APPENDIX B

History of Technology Integration in Schools

The federal government has played a critical role in modernizing schools and expanding technical capacity via several programs designed to increase Internet access, improve telecommunications, and fund research on technology in education for teacher training (U.S. Department of Education, 2007). Following the publication of the 1983 Nation at Risk: The Imperative for Educational Reform report, the U.S. Department of Education, released several policy publications examining a continued gap between the potential of technology integration to improve student learning and its implementation in schools. Federal focus on the performance of American schools increased with an emphasis on accountability and the recommendation for computer science as one of the five new basics to be included in high school graduation requirements (Bakir, 2016; Culp et al., 2003; Mitchell, 2011).

As technology continued to advance, researchers began to examine its impact on education more closely. One of the first major research and development studies promoting a partnership between technology vendors and schools was the *Apple Classrooms of Tomorrow* (ACOT) project. Initiated in 1985 by Apple Computer Inc., ACOT involved a collaboration between universities, public schools, and research agencies. Over a span of ten years, select K-12 classrooms were equipped with Macintosh computers, printers, scanners, laser-disc and video players, modems, and a variety of software to evaluate new technologies as an instructional tool. Participating students were also given a personal computer for their home (Baker et al., 1985; Dwyer, 1994, 1995; Dwyer, Ringstaff, & Sandholtz, 1990a, 1990b; Ringstaff & Kelley, 2002; Ringstaff, Yocam, & Marsh, 1996). This project aimed to influence educational reform by "building active, creative learning environments where children and teachers have immediate access to interactive technologies" (Dwyer et al., 1990a).

Throughout the process of observing teachers and students, ACOT identified five stages of technology integration: (1) Entry, (2) Adoption, (3) Adaptation, (4) Appropriation, and (5) Invention (discussed in further detail under "New Recommendations for Technology Integration). They also created the "ACOT Teacher Development Center" project focused on professional learning. As part of the project, accomplished ACOT teachers and students would model effective practices while hosting other teachers in their classrooms to observe and work alongside with them. This served as an in-service training opportunity that was situated in the practice with an interactive and learner-centered format. It included weeklong practicums during the school year, summer leadership institutes, and follow-up support extending a year after participation, which all focused on introducing teachers to new instructional tools and strategies for technology integration (Baker et al., 1985; Dwyer, 1994, 1995; Dwyer et al., 1990a, 1990b; Ringstaff & Kelley, 2002; Ringstaff et al., 1996). Although participating schools were engaged in these projects, there was still resistance among teachers to the non-traditional instructional methods being implemented. Over time, researchers observed changes in both teachers and students' behaviors as they continued the study (Dwyer, 1994, 1995; Dwyer et al., 1990a, 1990b).

According to Dwyer (1994), "meaningful use of technology in schools goes far beyond just dropping technology into classrooms." He further describes how this experience led to a transformation of teachers' instructional beliefs and practices as they began to achieve a balance between the "appropriate use of direct instruction strategies and collaborative, inquiry-driven knowledge-construction strategies" (p. 9)." Findings in a ten-year follow up report revealed that as ACOT teachers became more comfortable with technology, they began to interact differently with their students as "guides or mentors and less like lecturers" (Dwyer, 1995, p. 11). Dwyer

(1995) emphasized the need to explore professional development issues further and he discussed how teachers' personal efforts to "make technology an integral part of their classrooms caused them to rethink their most basic belief about education and opened them to the possibilities of redefining how they went about providing opportunities for students to learn" (p. 11).

Despite increased access and new opportunities for professional learning in select schools, many teachers—especially those not involved in projects such as the ACOT, continued to struggle with integrating technology in their classrooms. Moreover, they needed further support on how integrate technology within a pedagogical framework to promote student collaboration and higher order thinking skills. The Office of Technology Assessment recognized that other barriers were preventing consistent technology use such as lack of equipment, inadequate or inappropriate training, and anxiety about modern technology (OTA, 1988, 1989, 1995a, 1995b). In response to the Improving America's Schools Act of 1994, the first National Education Technology Plan, "Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge," was prepared in 1996 by Secretary of Education, Richard Riley (U.S. Department of Education, 1996, 2000b). The plan generously included $2 billion in funding over the next 5 years with the aim of increasing connectivity and providing training for teachers, although states and districts would also need to produce matching dollars to meet targeted goals (U.S. Department of Education, 1996).

The CEO Forum on Education and Technology was also founded in 1996, providing a five-year partnership between education leaders and businesses committed to improving technology integration in schools, such as executives from Apple, BellSouth Business, Verizon, Dell Computer Corporation, IBM, Hewlett-Packard, and other corporations. As a result of their vested interest in the use of technology for teaching and learning, they issued five reports

analyzing technology integration in schools. These reports focused on education technology, professional development, federal funding, infrastructure, and further research development in an effort to support the national concentration on K-12 student achievement. Following these reports, the CEO Forum offered three recommendations: (a) broaden student achievement to include 21st century skills, which should be included in curriculum and assessment; (b) expand federal support for education technology investments, and emphasize equity in funding, ensuring that those schools with the greatest need benefit most from federal education technology programs; and (c) increase investment in research, development, and dissemination to determine effective technology methods to improve student achievement, while supporting the development of assessment tools that measure 21st century skills (Bakir, 2016; CEO Forum on Education and Technology, 1997, 1999, 2000a, 2000b, 2001).

During this transitional period, a nonprofit organization, the *International Society for Technology in Education* (ISTE) released the National Educational Technology Standards (NETS) as a guideline for teachers (ISTE 1998, 2000, Knezek, 2003). Additionally, at the Secretary's Conference on Educational Technology in 1999, emphasis shifted from technology infrastructure building and implementation to evaluating its effectiveness in schools, which included a focus on providing necessary professional development for teachers (McNabb, Hawkes, & Rouk, 2000; Moeller & Reitzes, 2011). This was especially critical because one-third of teachers reported feeling unprepared to use computers and the Internet for classroom instruction in a 1999 survey conducted by the National Center for Education Statistics (U.S. Department of Education, 2000a). While technology use in classrooms has increased over the years, many teachers continue to report that they need further training on strategies for creating

high-quality educational experiences with technology (U.S. Department of Education, 2000b, 2004, 2010, 2016).

Consequently, a revised National Education Technology Plan, "e-Learning: Putting a World-Class Education at the Fingertips of All Children," was released in 2000 with updated goals highlighting new initiatives such as the Technology Literacy Challenge Fund and the E-rate program (U.S. Department of Education, 2000b). The plan advocated for increased investment in federal, state, and local technology and inclusive professional development to improve overall proficiency. It advocated for further involvement of stakeholders including educators, students, parents, researchers, policymakers, higher education faculty, and other community leaders. Although the new plan reinforced goals presented in the 1996 NETP, research and evaluation were added to improve networked technology applications for teaching and e-learning (U.S. Department of Education, 2000b).

In 2001, the Elementary and Secondary Education Act was reauthorized as the No Child Left Behind Act (NCLB) and signed into law by President George W. Bush on January 8, 2002, shifting decision-making and resource allocation away from states and increasing the national government's role in education (U.S. Department of Education, 2005; Wardlow, 2016). NCLB addressed many of the previous technology concerns with several provisions to improve professional development through specialized grant funding under Title II, Part D, the Enhancing Education Through Technology Act of 2001 (EETT). The primary goal of EETT was to "improve student academic achievement through the use of technology in elementary and secondary schools" (p. 1671), with the aim to ensure that students become technologically literate. This objective included encouraging effective integration of technology resources and promoting further teacher training (No Child Left Behind, 2002).

When the *EETT* program was first launched in 2002, funding was over $700 million, although each fiscal year it steadily declined due to budget cuts (U.S. Department of Education, 2007, 2009). States and school districts used funding specifically for supporting teachers' technical and instructional needs, providing online learning opportunities, administering technology-enhanced assessments for accountability, and to purchase integrated data systems for evaluation and planning purposes. The main focus for schools however, was on professional development, as they were required to allocate at least 25 percent of resources on classroom technology integration training. The grant funding also ensured that students and teachers in "high-poverty or high-need" schools would gain access to educational technologies comparable with that of students and teachers in other schools. Furthermore, it empowered administrators to promote teacher leaders as technology coaches who could facilitate classroom support throughout multiple school sites (Beglau et al., 2011, ISTE 2011; U.S. Department of Education, 2009, 2016).

Accordingly, the EETT was viewed as "the most comprehensive federal program that supported improving student academic achievement in elementary and secondary schools through the use of educational technology" (U.S. Department of Education, 2009, p.1). In the first five years of the program, an estimated $600 million was spent on teacher professional development alone (U.S. Department of Education, 2007). Altogether, states received $3.73 billion in funding via EETT program funds between 2002 and 2010 until federal budget cuts led to it being officially defunded (Quillen, 2011). During this time frame, the U.S. Department of Education also published three subsequent National Education Technology Plans to support technology integration within teaching and learning in 2000, 2004, and 2010 (Bakir, 2016; U.S. Department of Education, 2000b, 2004, 2010, 2016).

While the EETT program had been a proactive vehicle for addressing inequities with education-technology access and professional development, its discontinuation led schools to rely on other state and local funding through bonds and taxes as the main source for technology-related spending (Bakir, 2016). In 2016, the Elementary and Secondary Education Act of 1965 was again reauthorized, this time as the Every Student Succeeds Act (ESSA) with a new approach to replace NCLB and the previous EETT program. Under Title IV, Part A, "21st Century Schools, Student Support and Academic Enrichment Grants," schools were authorized to divide funds among drug and violence prevention, student counseling, and education technology. As a result, this made appropriating and spending of the funds more challenging for district and school administrators, especially without the guidance of a separate technology initiated program such as the EETT (Every Student Succeeds, 2015-2016). Consequently, schools and districts have continued to explore new ways to support teachers with funding for technology equipment and appropriate professional development that meets their needs. To provide additional assistance, the U.S. Department of Education also released an updated National Education Technology Plan in 2016 with current research on best practices for technology integration. The 2016 NETP includes a discussion about contemporary models for professional learning and a wealth of resources that can be accessed online (U.S. Department of Education, 2016).

APPENDIX C

Participant Recruitment Letter

Seeking K-6 Teachers who are *Apple Distinguished Educators, Google Certified Innovators*, and/or *Microsoft Innovator Educator Experts* to Participate in Dissertation Study!

Research Question:

What are the experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?

Background Information:

Hello! I am a doctoral student at Pepperdine University in the Learning Technologies program. For my dissertation, I am conducting a study on the experiences of educators participating and earning titles in vendor-sponsored professional development programs designed to promote technology integration in their practice. Specifically, I am seeking interview participants who are: K-6 teachers with a multiple subject teaching credential/certification, at least 3-5 years of classroom teaching experience, and who have recently earned a prestigious title (e.g. *Apple Distinguished Educator, Google Certified Innovator*, and *Microsoft Innovative Educator Expert*) from vendor-sponsored professional development programs in the past three years. Six participants who fit these criteria will be accepted for inclusion in the study, regardless of race, ethnicity, physical ability, or socioeconomic status.

This study has earned IRB approval through Pepperdine University and participation is voluntary. Virtual interviews will be conducted via the Zoom video-conferencing application between October-December 2018 and should last no longer than 90 minutes. Interviews will be recorded and reviewed only by the researcher for data analysis. Participants' names and school/district details will be kept confidential to protect privacy. Additionally, the researcher will collect any real-world examples of educators' experiences that are shared, which may include their application video and related projects they have worked on since attending the academy or institute and earning their titles within the program. These artifacts will only be used to offer a more detailed understanding of the educators' experiences as described in the interview, although they will not be published in the dissertation.

Your contribution to this research project could help schools and districts gain further understanding about how these programs work and offer innovative strategies for professional learning. Additionally, it could help technology vendors to identify what educators are taking away from experiences in these programs, which may help in the evaluation of them. Educators who agree to be interviewed will be offered a **$25.00 Amazon gift card** for their contributions. If you are interested in participating, please sign up at: https://goo.gl/forms/Bm9WCVar0Dg9u72H2. Additionally, email you can me at [redacted] if you have further questions and feel free to share information with others who might fit the criteria. Thanks for your consideration!

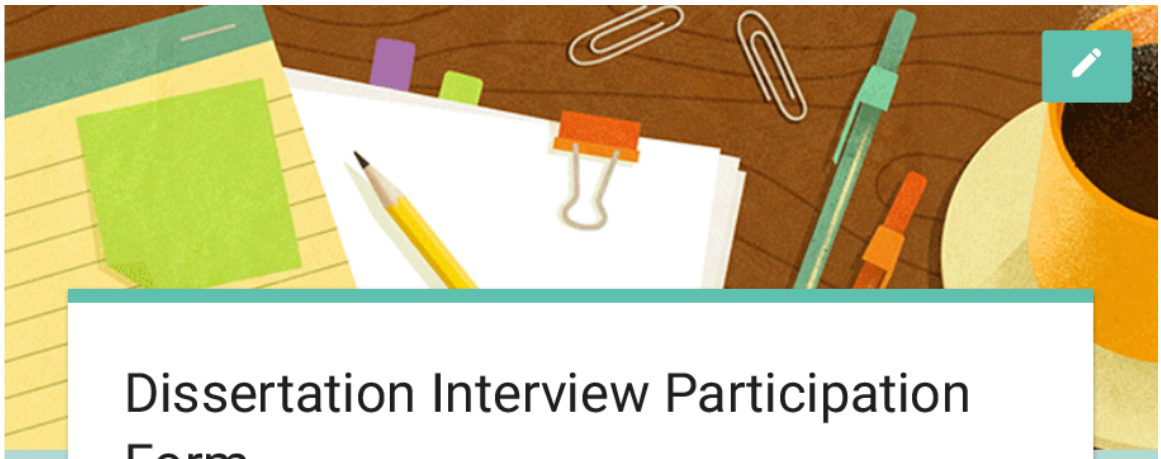
Distinguished Educator

CERTIFIED Innovator Google for Education

Microsoft Innovative Educator Expert

APPENDIX D

Interview Participation Form



Dissertation Interview Participation Form

Thank you for your interest in my dissertation study on the lived experiences of educators participating and earning titles in vendor-sponsored professional development programs designed to promote technology integration in their practice. I am seeking interviewees who are: K-6 teachers with a multiple subject teaching credential/certification, at least 3-5 years of classroom teaching experience, and who have recently earned a prestigious title (e.g. Apple Distinguished Educator, Google Certified Innovator, and Microsoft Innovative Educator Expert) from vendor-sponsored professional development programs in the past three years. Please fill out the form below if you agree to be considered as a participant. *Names and contact information will remain private and WILL NOT be included in the study results. Six participants who fit these criteria will be accepted for inclusion in the study, regardless of race, ethnicity, physical ability, or socioeconomic status. Interviewees will be offered a $25.00 Amazon gift card for their contributions. If you have further questions, please email me at: [redacted]

* Required

Name *

Your answer

Email *

Your answer

Phone Number

Your answer

Where are you located? (Country/State and Time Zone) *

Your answer

Do you have a multiple subject teaching credential/certification for K-6? *

- [ ] Yes
- [ ] No

Are you currently teaching in a K-6 classroom setting? *

- [ ] Yes
- [ ] No

How many years have you been teaching? *

- [ ] 3-5 years
- [ ] 6-10 years
- [ ] 10+ years
- [ ] Other:

Which of the following prestigious title(s) have you earned from sponsored technology vendor programs? *

- [ ] Apple Distinguished Educator
- [ ] Google Certified Innovator
- [ ] Microsoft Innovative Educator Expert
- [ ] Other:

What are the best days/times for you in terms of scheduling the interview? (Please select according to your time zone.)

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
6:00 AM-8:00 AM	☐	☐	☐	☐	☐	☐	☐
3:00 PM-5:00 PM	☐	☐	☐	☐	☐	☐	☐
6:00 PM-8:00 PM	☐	☐	☐	☐	☐	☐	☐
8:00 PM-9:30 PM	☐	☐	☐	☐	☐	☐	☐

SUBMIT

Never submit passwords through Google Forms.

APPENDIX E

Waiver of Written Consent Form

PEPPERDINE UNIVERSITY

Graduate School of Education and Psychology

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

PROFESSIONAL LEARNING IN THE DIGITAL AGE: A PHENOMENOLOGICAL STUDY ON THE LIVED EXPERIENCES OF EDUCATORS' PARTICIPATION IN PROGRAMS SPONSORED BY TECHNOLOGY VENDORS

You are invited to participate in a research study conducted by **Cassandra Kelley, doctoral candidate, principal investigator, and Judith Kledzik, Ph.D., faculty advisor,** at Pepperdine University, because you are an elementary educator who has recently earned a prestigious title (e.g. *Apple Distinguished Educator*, *Google Certified Innovator*, and *Microsoft Innovative Educator Expert*) from a vendor-sponsored professional development program for your technology integration skills. Your participation is voluntary. You should read the information below, and ask questions about anything that you do not understand, before deciding whether to participate. Please take as much time as you need to read the consent form. You may also decide to discuss participation with your family or friends. If you decide to participate, you will be asked to sign this form. You will also be given a copy of this form for you records.

PURPOSE OF THE STUDY

The purpose of this phenomenological study is to understand the lived experiences of educators who have participated and earned titles (e.g. *Apple Distinguished Educator*, *Google Certified Innovator*, and *Microsoft Innovative Educator Expert*) in vendor-sponsored professional development programs designed to promote technology integration in their practice. The phenomenon that will be examined is the acquisition of status and how educators' professional identities change as they earn prestigious titles from technology vendors for recognition of their skills with technology integration.

STUDY PROCEDURES

If you volunteer to participate in this study, you will be asked to meet for a 60-90 minute online interview with Cassandra Kelley, the principal investigator. This virtual interview will ask about your experiences participating and earning titles (e.g. *Apple Distinguished Educator*, *Google Certified Innovator*, and *Microsoft Innovative Educator Expert*) in vendor-sponsored professional development programs designed to promote technology integration in your practice. If you are willing, the principal investigator would like to share the analysis results of the interview data collected from you to verify its accuracy. This meeting would also be conducted virtually, and it should take approximately 20-30 minutes within two-weeks of the initial online interview. This follow-up meeting, however, is your option and is not essential to the study design.

Both the audio and video of this interview will be recorded using Zoom video conferencing software and both forms of data collection are essential to the design of the study. All data collected in the interview will remain in the principal investigator's possession and all published information will be de-identified so that no personally identifiable information will be disclosed during this study or in its publication.

POTENTIAL RISKS AND DISCOMFORTS

The risks and discomforts associated with this research are minimal due to the non-intrusive nature of the interview. The potential and foreseeable risks associated with participation in this study include loss of time, boredom, and inconveniences. You are free, however, to withdraw from the interview at any time, if that is your desire.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

There is no direct benefit to study participants. Potential benefits to study participants include:

- Opportunities to reflect on and share your experience as an educator who has participated in a technology vendor-sponsored program

Potential benefits to society include:

- Helping schools and districts gain further understanding about how these programs work
- Sharing innovative strategies for professional learning
- Allowing technology vendors to identify what educators are taking away from experiences in the programs that are currently offered
- Contributing to the body of knowledge on the acquisition of status and how educators' professional identities change as they earn prestigious titles from technology vendors

PAYMENT/COMPENSATION FOR PARTICIPATION

You will receive a $25 Amazon gift card as a token of the principal investigator's appreciation for your time and allowing your interview data to be used in this study.

CONFIDENTIALITY

I will keep your records for this study anonymous as far as permitted by law. However, if I am required to do so by law, I may be required to disclose information collected about you. Examples of the types of issues that would require me to break confidentiality are if you tell me about instances of child abuse and elder abuse. Pepperdine University's Human Subjects Protection Program (HSPP) may also access the data collected. The HSPP occasionally reviews and monitors research studies to protect the rights and welfare of research subjects.

Information will not be shared with anyone who is not essential to the design and completion of this research study. The raw interview data will be stored on a password-protected computer in the principal investigators place of residence. The audio data collected will be transcribed by a company that has established processes in place to ensure the information is kept secure, and those transcripts will be de-identified by the principal researcher and stored separately from the

raw audio data. The raw the video data will be destroyed within 6 months after the defense of the dissertation.

SUSPECTED NEGLECT OR ABUSE OF CHILDREN

Under California law, the researcher(s) who may also be a mandated reporter will not maintain as confidential, information about known or reasonably suspected incidents of abuse or neglect of a child, dependent adult or elder, including, but not limited to, physical, sexual, emotional, and financial abuse or neglect. If any researcher has or is given such information, he or she is required to report this abuse to the proper authorities.

PARTICIPATION AND WITHDRAWAL

Your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

ALTERNATIVES TO FULL PARTICIPATION

The alternative to participation in the study is not participating or answering only the questions, which you feel comfortable.

INVESTIGATOR'S CONTACT INFORMATION

You understand that the investigator is willing to answer any inquiries you may have concerning the research herein described. You understand that you may also contact the people listed below if you have any other questions or concerns about this research.

Principal Investigator
Cassandra Kelley
[redacted]

Faculty Advisor
Judith Kledzik
[redacted]

RIGHTS OF RESEARCH PARTICIPANT – IRB CONTACT INFORMATION

If you have questions, concerns or complaints about your rights as a research participant or research in general please contact Dr. Judy Ho, Chairperson of the Graduate & Professional Schools Institutional Review Board at Pepperdine University 6100 Center Drive Suite 500 Los Angeles, CA 90045, (**310) 568-5753** or gpsirb@pepperdine.edu.

APPENDIX F

Interview Topic Guide

This purpose of this topic guide is to allow you to gather some thoughts around our upcoming interview. As you share your experiences in this interview, please remember that there are no right or wrong answers. I am simply asking you as a K-6 teacher, who has earned a prestigious title in a technology vendor-sponsored program, to relay your own experiences as you have lived them. Here are some things to think about for our upcoming interview:

- **The types of professional development for technology you have participated in (within and outside of your school/district)**
- **Your experience participating in technology-vendor sponsored programs (from your inspiration to pursue this, your application process, your experience in the program, through now) and how it compares with other professional development opportunities you have participated in for technology integration**
- **Your attitudes and beliefs about technology integration and your motivation for participating/earning titles in technology vendor-sponsored programs**
- **Your experience with other educators in the technology vendor-sponsored programs**
- **Your recommendations of innovative strategies for professional learning based on these experiences**

The story of your experience with issues such as these will produce a very fruitful interview. Here are some more details for the interview:

- Please allow up to 90 minutes for the interview.
- Please try to take the interview from a comfortable, distraction-free location with a broadband Internet connection.
- The date and time for your interview is:

- The URL for your interview is: _____
- The password for your interview is: _____
- If you are not familiar with the Zoom conferencing platform, please a few moments to familiarize yourself with it here: https://support.zoom.us/hc/en-us

APPENDIX G

Interview Protocol with Verbal Consent Form

Ground Rules:

Thank you for agreeing to participate in this interview. You were invited to share your experience with participating and earning title(s) such as *Apple Distinguished Educator*, *Google Certified Innovator*, and *Microsoft Innovative Educator Expert* in technology vendor-sponsored professional development programs because you are a K-6 teacher who has recently accomplished this in the past three years. As you share your experiences, insights, and ideas today, I want to assure that everything you say to me will be kept confidential and that no personally identifiable information will be shared with anyone or in my final dissertation. Also, you are free to end the interview at any time and request that your interview data not be used in this research. You received an informed consent letter after agreeing to this interview. Do you have any questions regarding that document? [Wait for answer].

Both the video and audio of this interview will be recorded. No actual images from the interviews will be shared in the research, but just to ensure anonymity, please ensure no personally identifiable information shows in the video. If you choose to use names of persons or schools, they will be changed in any quoted information shared in the research document. The recording will be downloaded onto my password-protected device and only myself, and those essential to the completion of this dissertation project will have access to the recording. During the interview, please keep the video on so that, as much as possible, we can approximate face-to-face interaction. Do you agree participate in the interview? I will ask next question again once the recording starts, but do you agree to be recorded? [On yes] I have begun recording.

–Start Recording–

Just to verify, you have given permission to record this interview. Is that correct? Thank you.

The primary question in my research is: ***What are the experiences of educators who have earned titles in vendor-sponsored professional learning programs designed to promote technology integration in their practice?***

(continued)

During the interview, I may ask follow up questions to clarify my understanding or explore specific themes, but for the most part, my intent is simply to allow you to share your experience as comfortably and completely as you can in the time allotted. I plan to end this interview at: [within 90 minutes of the start]. Do you have any questions with what I've shared so far?

I will now begin with the first question…

APPENDIX H

Interview Questions

Background Questions:

1. What is your background and how long have you been in education?
2. What is your position in the school/district where you work?
    a. What are you teaching?
    b. Are you in any type of mentor role?

Phenomenological Questions:

Today we're mostly going to talk about your experiences in <Vendor Program>, from what inspired you to pursue this opportunity, to your application process, your experience in the program, through now.

1. Would you like to start with telling me what inspired you to pursue earning recognition as <Vendor Title> in the <Vendor Program> and what you consider as the beginning of your experience?
    - **Prompting if necessary**: Can you tell me more about your application process (i.e. *developing the video, finding out you were selected, and attending your first academy/institute*?)
2. I'd love to hear about what you have experienced since earning the title(s) from the <Vendor Program>. Can you tell me about this?
3. Can you discuss how you currently integrate technology within your practice?
    - **Follow up:** Can you provide real-world examples of lessons/projects you have created or are currently working on?
    - **Follow up:** How much did the <Vendor Program> help/not help you with integrating technology in your practice or how did your practice change from

before?

4. Can you describe any innovative professional learning strategies for technology integration that you have observed through your experiences in the <Vendor Program>?
    - **Follow up:** Based on your experiences, what do you think vendor programs should do more of, less of, or differently?
    - **Follow up:** Based on your experiences, do you think this kind of PD would work for more teachers in your school? Why/why not?
    - **Follow up:** What has been your experience with other educators in the <Vendor Program>? What have you seen them doing?
5. Is there anything else you would like to share?

APPENDIX I

Institutional Review Board (IRB) Approval Letter

PEPPERDINE

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: September 26, 2018

Protocol Investigator Name: Cassandra Kelley

Protocol #: 17-10-637

Project Title: Professional Learning in the Digital Age: A Phenomenological Study on the Lived Experiences of Educators# Participation in Programs Sponsored by Technology Vendors

School: Graduate School of Education and Psychology

Dear Cassandra Kelley:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

APPENDIX J

Codebook Organization and Examples

Emergent Themes Organized by Wenger's (1998) Five Dimensions of Identity

Dimension 1- *Identity as the negotiated experience of self:* Defining what the earned titles mean	
Emergent Codes	**Example from Interviews**
Encouraged by others to apply	"I was getting a lot of mentorship from the head of our schools that first year and she said, 'You know, you have the skills… you're doing all the things, you should try it,' even though I was a first year teacher. So, I created the artifact and have been in the community and reapplied every year since." (P5)
Competitive	"I think there has to be some level of competitiveness because the teachers that I know who have applied are excited about Microsoft and have done so many more cool things than I have... Plus, I know other *MIE Experts* who have tried to bring really great teachers into the community that were just like, "Oh my gosh, I know this awesome teacher who is doing amazing things," but they didn't get picked." (P6)
Self-Starter	"I definitely think it (referring to the *MIE Expert* program) is more beneficial to the "self-starter" type of teacher because I would agree with what that *Microsoft Certified Trainer* told me about getting what you want out of it. There's no one looking over your shoulder saying, "You have to go to listen in on the calls, you have to follow the GroupMe or the Facebook page, or you have to engage in this or that area." So if you choose to get your extra "E" (referring to moving from *MIE* to *MIEE*), but you don't do anything— or even if you are doing cool and amazing things in your classroom, but you don't tell anybody, then you know... you just have to be that kind of person that's going to take what you're learning, do something with it, and be willing to share because I think that's a big component of all these kind of programs." (P6)
Showcasing skills	"I personally don't try to use it to be like, "I'm so much better than you." I always feel like it's a way to connect with people, share ideas, and show people, "Well, here's how I'm using this product and maybe this will help you," which sets a really good tone in education. I don't think any of these designations, whether they're Google, Apple or Microsoft... I don't think the point is to say one is better than the other. I think it's just to say, "I'm using this, I'm having success, and here's how my students are using it… These are some of the outcomes and you might consider trying this." (P2)

Recognition	"I guess as egotistical as it sounds, it definitely felt good to be honored or recognized." (P4) "I actually didn't do it to get recognized, I did it more to help us as a school district." (P3)
Inspired to deploy new technologies	"I started teaching with iPads, hit the ground running, and I was just blown away. This was probably like my fifth year of teaching and I was more inspired to be better as an educator. That year, we had those 10 iPads and after that, our principal was very supportive and he got us 100 iPads to be 1:1 in our district. I had heard of *Apple Distinguished Educator*s through Twitter and I received a lot of support from other educators on Twitter. That was the main thing…I jumped on Twitter and quickly got into this big, huge network of other educators that were just like me here in this little bitty town. So, I was speaking with educators across the world in Australia and the United States and I heard more about this program and I just fell in love with Apple. I went and got myself an iPhone and I applied." (P3)

Dimension 2- *Community membership:* Connecting with other educators

Emergent Codes	**Example from Interviews**
Sharing ideas	"Having all that energy and those ideas I think definitely kind of helps stimulate your brain in some ways and pushes your thinking for sure, but I think that again goes back to connect you with the people that are there." (P4)
Project collaboration	"I've collaborated on a couple of different projects, both with other mentors—designing lessons, sharing ideas… Sometimes it's answering questions or saying, 'Hey, I have this idea. What are your thoughts?' Sometimes it's actually working directly with the Minecraft team." (P5)
Establishing relationships	"I knew a few people through Twitter and Google Hangouts, but when you finally meet with them face-to-face, the relationship gets real and we do still connect through messaging or whatnot." (P1)
Community building	"Apple has totally hit the nail on the head in terms of having a really rich community. There are *Apple Distinguished Educator*s who are retired and they're still active in the community... They were like the first teachers to have the old Macs— the big ones in their classrooms. There's a little bit of a history there... I think they're really personable and they have a better sense of community." (P2)

Forming PLNs	"I was really looking forward to just expanding my professional learning network there to meet up with other educators like myself who were using the tools and unique and innovative ways." (P2)
Twitter/ Social Media	"I follow and I get connected with everyone on Twitter, which is another advantage. Through social media, you start connecting with more of the *MIE Experts* and you get glimpses into other parts of the country. So you do get to see, especially if you're near where a conference is, teams will— at least some people— go and visit different schools. So I've seen a lot of activity and that's how I think the education team at Microsoft makes connections with schools as well by hearing what different *MIE Experts* are doing." (P5)

Dimension 3- *Identity as a learning trajectory:* Applying new skills learned within and outside of the classroom	
Emergent Codes	**Example from Interviews**
Higher education	"As soon as I graduated with my bachelor's degree, I started my master's degree and finished that in a two year program, so I'm also a K-12 Certified Reading Specialist." (P3)
Growth Mindset	"Yeah, I think, I think it goes back to that mindset example I was saying. I think for educators who really love and are passionate, I think we'll get a lot out of both of these communities. I don't think it's really about--I think it's about that mindset and if you want to continually get better at your practice." (P2)
Early Adopters	"My first year there, they just switched to Microsoft services as the 1:1 device. I helped to integrate that in and just dived head first into learning things like *Sway* and *OneNote* classroom." (P5)
Mentoring/Coaching	"I mentor other teachers by planning collaborative lessons. We had a new first year teacher without an education background teaching fifth grade and at the beginning of the year, we did a collaborative Minecraft lesson. Not only did I show her the design of a multi-disciplinary lesson, but I also helped her to have a positive experience with Minecraft. To me, that's been the best way to mentor someone." (P5)
Consultant work	"*Google* hired me as a consultant to train a large group of teachers who were launching a bunch of *Chromebooks.* They wanted me to show teachers the powerful things you could do in classrooms with students using *G Suite*, *Chrome*, and *Google Classroom*." (P2)

Presenting at conferences	"A lot of us present at conferences, so I think that's the part of the program. All of our teachers presented at NCCE last year- *MIE Expert* or not —at least in some capacity, even if it was just speaking on a panel." (P5)
Developing curriculum or other resources	"I've worked with Apple and the Department of Education to publish iTunes U courses and that's probably one of the reasons why I got picked is—from day one as an elementary teacher, Apple liked what I was putting out there with iTunes U." (P3)
Dimension 4- *Identity as a nexus of multi-membership:* Comparing identities as educators in schools and participants in the programs	
Emergent Codes	**Example from Interviews**
Isolation in school	"I sometimes ask, 'am I the only one?' When those amazing people are saying the same thing, then maybe I'm on the right track...I found more people like me outside of the classroom or school and that was really helpful. It's just a really different dynamic. People there are all alike in a way because we all took a risk to put ourselves out there and just want more or to keep changing, progressing, and learning." (P1)
Other teachers not recognizing titles	"I think some people don't really know what it is to be honest...I think employers might see it, but I don't think a lot of leaders know— unless they themselves are an *Apple Distinguished Educator,* really understand what it is and why someone would do that." (P2)
Participating in more than one vendor program	"In 2013, I applied for the *Apple Distinguished Educator* program and luckily I got into that and then I also applied for the *Google Teacher Academy*. Now it's called "*Google Certified Innovator*." (P3)
Accountability	"You're supposed to train others— it's kind of 'each one, teach one.' You also have to submit your hours, you're encouraged to take some of the Microsoft courses to keep fresh, and you have to show evidence of the badges or recognitions that you've earned." (P6)
Tensions	"I put hours and hours of time in for two years straight to being the best… I was a tech leader in the state and I ran my own tech conference here in my city. I was at my max with the amount of days I could leave during the school year and then my summers were filled up... Finally, I decided, I was burned out." (P3)

Dimension 5- ***Identity as a relation between local and global contexts:*** **How educators define themselves through their participation and what they see as meaningful**	
Emergent Codes	**Example from Interviews**
Student-Centered	"Some researchers are coming out and saying things against technology... I think we just have to be willing to see both sides and the big picture, which is kids learning— that has to be the center. I'm not really big on focusing on tools… I think when we set student learning as the biggest goal, the technology will come in its' right place." (P1)
Giving students choices with technology tools	"If I find a student likes to use Google Slides vs. Keynote for presentations, it doesn't matter to me. They should get to choose that. I will show them a variety of tools, but in the end I want them to select what they are comfortable with. I think it's more important to look at a task and determine what fits the needs of the students or to let them choose depending on their age and skills." (P2)
Inspired by other educators	"You have a community of people that will encourage you or push you. There was a kindergarten teacher using OneNote notebooks with her kindergarteners... I was like, 'ok, maybe they can do a digital One Note and navigate that. So you can get inspired by seeing what other people are doing." (P6)
Champion	"Overall, I feel like in having this role it's implied that you should be a champion of your causes. I also feel like if I'm going to carry this role, "How am I sharing it with people?" I definitely hold myself to a higher standard…I think it's about helping to change the education system so we can make it better for kids." (P4)

Emergent Themes Organized by Innovative Methods for Professional Learning

Theme 1: ***Learning continues through online collaboration, in-person meet-ups, and alumni events***	
Emergent Themes	**Example from Interviews**
Learning continues	"The educators that were there really shared a lot of best practice about what was happening in the field. I came home with so many ideas and I felt like the learning kept going after we left...I'm still in contact with a lot of people that I met." (P2)
Meet-ups	"You stay connected with people through the meet-ups. *Google* has what's called 'The Energizer' and sometimes at larger events like ISTE or CUE, they give you chances to connect." (P4).

Online collaboration	"So we have the OneNote Notebook, which is our main big communication and then we use GroupMe. There is an overall *MIE Expert*s Global, *MIE Experts* United States, and within that there are regional groups. I'm part of a GroupMe for both the Global and U.S. *MIE Experts*, in addition to the Pacific Northwest Regional group. We have discussions that can range anywhere from coordinating a local meet-up to just sharing exciting things that are going on in the classroom… There probably are around anywhere from 4 to 30 messages a day. We also started a Slack channel last year and moved to teams. We have a ton of organizational chat groups from: mentors helping mentors to language arts lesson designs, and then all the subjects, primary grades, middle grades, high school and university, etc. So we have a bunch of different discussion feeds along with tech help and a Minecraft one...There are at least 20 channels with different conversations going on." (P5)
Alumni events	"Apple has alumni events and they always run an event once a year. You still have to kind of apply or put your name in the hat to go and a lot of it is to just like rejuvenate your ideas, connect with people, and sometimes you present —if you want to share an idea like a cool project or something that you did, you can submit that too." (P2)
Theme 2: *Direct interaction with technology vendors' product developers and opportunities to pilot new products*	
Emergent Themes	**Example from Interviews**
Interaction with Developers	"I think with Apple when you go there, they're really interested in what you're doing and how you're using the tools. They're there to support you and sort of any sort of project that you're working on or any sort of thing that you might need. I do feel that Apple takes your story and your practice- your instructional practice very seriously. So if you want something in a product or piece of software, especially around student accessibility, they will do that for you. I mean, they really will move mountains and introduce you to the developer. They have changed products and things that I've suggested." (P2)
Beta-Testing	"I also work with a Minecraft team. They'll send out betas to us early that we can implement in our classrooms. We are then able to give feedback on things before they're officially released. Around the world, we were all demo testing and providing feedback... If we ran into a bug, we would send that or even if something's not working the way we would expect it to, there's direct access to people on the team who can help troubleshoot or update the code if it needs to be fixed." (P5)

Learning about new releases	"You sign a nondisclosure, so there are certain things like webinars you can join about early releases…You definitely get insight or information before it comes out to the general public. They might even ask you for feedback on certain products." (P4)