TARGETED TECHNOLOGY PROFESSIONAL DEVELOPMENT

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Dedication

I dedicate this body of work to those who have supported me along my academic, personal, and professional journey. My parents, Peter and Helen, have provided me with a great deal of love and support throughout my lifetime. They engrained the importance of a strong work ethic, flexibility, humor, and perseverance within our family. I thank my siblings, nieces, and nephews for their support. I am grateful for the constant presence that my sable fawn chihuahua, Lexie, has provided throughout this experience.

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Abstract

The purpose of this Capstone Research Project was to determine whether targeted technology professional development increased communication, employee engagement, beliefs about change, and strategic planning among teachers. These four areas of growth were named in a survey disseminated to all staff members within the study site's district during the 2018-2019 school year by an independent education consultant. The intervention, including a cohort-based sampled, which allowed teachers to engage in co-planning, co-teaching, and sharing days was designed after reviewing previous studies that showed promising results with in-person support. Surveys created by Apple, interviews conducted by the researcher, and informal conversations were data sets that showed the following: teachers' perceptions of recognition (communication, employee engagement, beliefs about change), teachers' perceptions of technology (communication, employee engagement, and strategic planning), elements of student learning (beliefs about change and strategic planning), and the frequency of student product creation (beliefs about change and strategic planning).

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Chapter 1: Introduction

The study site's district invested approximately $2.8 million on iPad leases over the course of three academic school years. When making the decision to lease iPads, the district focused on factors such as return on investment, the capabilities of various devices, and the ability of the device to support the district's vision in accordance with the 21st Century Learning Plan, which laid the foundation for the district's education technology program.

Beginning in the 2017-2018 school year, students and teachers at study site's high school were provided 5th Generation iPads as a means of enhancing equitable opportunities and learning experiences. Teachers received minimal training; however, in accordance with the 21st Century Learning Plan, a team of teachers who were either Google or Apple Teacher certified was elected to become "techsperts" in the building. The role of the techspert was created to encourage teachers looking to effectively integrate technology into their lessons, to assist with the development of professional learning opportunities for staff members, and to support students on an on-demand basis in a central location.

The 2018-2019 school year marked the rollout of iPad integration at the elementary level; there were approximately 25 techsperts spread throughout seven elementary schools who provided the same support to their colleagues and students as the high school techsperts provided. Unlike their peers, elementary techsperts were not housed in a central location in each school; their designation as full-time teachers stipulated that they did not have a duty period in their schedule. During this time, central- and building-level administrators supported the need for techsperts to receive additional

training to continue their professional learning. The district had been able to send a small percentage of teachers to trainings at the local intermediate unit, an equity consortium, and various technology conferences at both the state and national levels.

Through the use of feedback surveys and informal conversations, the Supervisors of education technology and other administrators noted that teachers were in favor of greater time allocated to professional learning opportunities based upon choice. The Supervisors of education technology and techsperts provided a variety of learning opportunities; teachers were allowed to choose various apps or platforms of interest to incorporate into their classrooms. However, discussions regarding expectations and the continuum and progression of digital learning for both teachers and students did not occur on a regular basis, which led to a lack of buy-in from all staff members.

A climate survey conducted by an independent educational consultant was conducted in August 2018; the results were released in February 2019. Approximately 48% of employees participated in the survey. The survey results yielded responses, which acted as an impetus for this research project. The survey identified four major areas of concern in relation to professional learning opportunities: communication, employee engagement, beliefs about change, and a focus on strategic planning. When reflecting upon the investment that the district made for the lease of devices, several issues became apparent:

1. The district did not allocate time to review and assess the 21st Century Learning Plan.
2. There had not been an adjustment of the plan by a team based upon the district's mission and vision.

3. Choice-based professional development did not always correlate with increasing student agency and the ability to create.
4. Scaffolded expectations were not presented to teachers regarding technology integration.
5. Coaching and mentoring was optional at all schools
6. Teachers who utilized technology to allow for greater student agency and creativity were infrequently recognized.
7. Solid pedagogical lessons that utilized technology were not shared due to a lack of co-planning time or hesitancy.

Prior to signing the 2019-2020 lease for the middle school, building administrators and supervisors shared some implementation concerns with the central office team, who in turn shared them with the vendor, Apple. The result was a cohort of 20 individuals based upon application who were guided by Senior Apple Learning Specialist, CK, and me, the Supervisor of education technology, 6-12. Included in this cohort were one principal from the middle school, two elementary teachers, two high school teachers, and 15 middle school teachers. The rationale was to incorporate other members of the school community who could assist in replicating the experience in their own schools. There was no cost to this service; the only financial obligation that the district experienced involved hiring substitute teachers to cover cohort teachers' classes during the showcase days, which were split into two sessions. While this was not a cost attributed to the research, it could be a cost in the future.

As I formulated the project, I focused on communication, employee engagement, beliefs about change, and strategic planning. I created a website for each of the schools

that I managed in order to share when teachers earned Apple Teacher certifications. A hashtag was created and utilized for teachers and administrators to share lessons that incorporated technology; the district's homepage was altered to integrate a platform, Juicer.io, that aggregated the hashtag to highlight teacher and student work. I created an audio podcast, which was shared through social media and the district website; episodes highlighted teachers who took risks and utilized engaging technology practices in their classrooms. Finally, Apple administered survey to teachers, which focused on their perceptions regarding recognition, preparedness to integrate based upon professional learning opportunities, student engagement and creation, and teacher preparedness to design innovative lessons. The research in which I engaged relied upon a mixed methods research design that provided the district with valuable information to drive future professional learning opportunities. The research questions on which I focused were:

1. How are teachers recognized for what they've learned in regard to education technology? Do teachers feel engaged in the professional learning that they have taken part in, and will a formalized recognition system within the school district help to better engage teachers?
2. How do teachers' perceptions affect how they feel regarding preparedness and professional learning and the integration of technology within their schools?
3. What are teachers' perceptions about the integration of technology into their classrooms upon student engagement and the ability of students to create relevant, product-based artifacts of learning?
4. What are teachers' perceptions of their own preparedness to design innovative learning experiences with the elements of student learning (teamwork, critical

thinking, personalization of learning, communication/creation, real-world engagement)?

Over the course of my administrative career in the study site's district, there were three waves of iPad rollouts at the three building levels (elementary, middle, and high school). The climate in the district was influenced by a number of factors including: negative feelings toward administrators, negative perceptions regarding mounting professional responsibilities, and negative sentiments about the quality and amount of time spent engaged in professional development.

I desired to implement an intervention that would impact teacher attitudes through ongoing administrative support, continued collaborative opportunities with peers and trainers, and integrated professional development meant to enhance student learning outcomes that provided teachers with real-life application opportunities that focused on student learning elements, student engagement, and student production. Prior to forming the research questions, I reviewed literature that focused on technology professional development. A variety of studies were utilized and informed the creation of the research questions that guided this project. The research presented in the literature review focused on global implementation and veered into fields beyond education.

Chapter 2: Literature Review

Teacher Recognition Systems in Relation to Technology Professional Development

Badge systems and correlating certification programs have grown in the field of professional development options afforded to educators in recent years. These systems have allowed educators to learn, practice, and demonstrate skills and be recognized through earning and displaying the badge. Badging systems are reminiscent of the Boy and Girl Scout programs in the United States (Abramovich et al., 2013).

A driving force behind online badging systems was the open learning environment afforded to educators. Unlike traditional professional development, the majority of badging systems were available on-demand and asynchronously; however, some required synchronous participation to take place in order to earn a badge. The majority of models did not require the participant to directly interact with other learners or an instructor to earn a badge. A widely used model was the Apple Teacher program, which was free to educators; educators were able to earn badges in various platforms: iOS, MacOS, and Swift Playgrounds. The Apple Teacher certification program provided simple tutorials for learners to engage in either online or offline; participants answered a series of assessment questions to demonstrate mastery and earn badges. The majority of skills practiced on the iPad or computer did not require the use of the Internet; however, Apple Teacher certification assessment required the Internet. When the learner did not earn the badge, Apple provided opportunity to retake the assessment.

Zhong and Feng (2019, p. 1764) conducted research on a blended model of the Apple Teacher program in China:

> The "Apple Teacher" program is a teacher training program cooperated by The Modern Education Technology Center of Nanjing Normal University and Apple, and the course is mainly for the in-service teachers or future teachers. The purpose of "Apple Teacher" is to help teachers master the way to acquire digital information resources, apply modern teaching methods to classroom teaching activities, and ultimately find innovative ways of classroom teaching.

Unlike the traditional online format of Apple Teacher, this cooperative program blended online learning with face-to-face learning. Within this specific blended learning model, three essential components existed: (a) basic knowledge of learners, (b) theme learning, and (c) summary and reflection (Zhong & Feng, 2019). In the three stages of learning, a teaching assistant was available to teachers for support, which was a variation from the traditional Apple Teacher certification areas that were offered by the corporation. In effect, teachers demonstrated proficiency to the teaching assistant prior to taking the online assessment through the Apple Teacher portal (Zhong & Feng, 2019). In the next component, the teaching assistant took learners to an Apple Store to gain experiential learning; Apple offered free sessions at all their stores. This particular program upheld that within "this process, learners can further pool their knowledge and skills and improve and perfect their cognitive structure by communicating with lecturers and peers. In the part of self-creation, learners practice by themselves to realize the externalization of knowledge" (Zhong & Feng, 2019, p. 1767). Finally, learners experienced deep learning through reflection and shared their experiences with other teachers, which could have been a driving external motivator. Sharing their learning experiences with others allowed teachers to better internalize their own learning (Zhong

& Feng, 2019). In Zhong and Feng's study (2019), six blended training courses were administered with 176 participants. The support of a teaching assistant seemed to have a positive correlation on the overall achievement of those enrolled in the program; 90.3% of participants earned the badges they attempted and were awarded Apple Teacher certificates. No data was available to demonstrate how many teachers did not initially earn badges on the first attempt, so a definitive conclusion cannot be drawn.

Abromovich et al. (2013) researched the psychological theories behind learner motivation and focused upon the achievement goal theory. Within the same research, Abromovich et al. cited educational psychologist Dr. Elliot, who identified types of learner motivation. The two types that were most relevant to this project included mastery approach, which was based on one's personal interest, and performance approach, which was based on the learner's goal of performing better (2013). The motivation behind earning badges was not solely learner based. For instance, recognition from school administrators may have acted as an impetus to earn digital badges and certifications. According to Jones et al., however, recognition was often placed upon hours spent on professional development rather than the skills that were acquired during that time (2017). According to this research, it was imperative that administrators comprehended and recognized the value of the badges. It was of greater importance for teachers to demonstrate their abilities after earning badges to show transformational learning and the ability to apply said learning to classroom instructional practices. Jones et al. (2017) cited Lev Vygotsky's research to conclude:

> Attaching symbolic importance of an artifact, such as a digital badge, then allows the artifact to influence others' perceptions of the individual possessing the

> artifact. Thus, recognition of artifacts by others shapes an individual's identity. … Digital badges can act as symbolically important mediating devices that allow others to recognize the new roles being assumed by the learners. (p. 430)

When comparing digital badges to traditional badges and certificates, there seemed to be a disparity in the way that participants displayed or shared the newly acquired badge. Jones et al. found that the majority of participants did not share their badges through social media because they did not want to call attention to themselves or intertwine their personal and professional lives (2017). Jones et al. found that some participants utilized badges in their email signatures but expressed frustration with the inability to manipulate or modify the badge. They were more likely to share their digital badges with administrators to demonstrate competency. The majority of the participants reported that they would not be motivated to engage in professional development where there was no relevant connection simply to earn a badge (2017). There were no studies that mentioned whether teachers were more apt to display badges if they had a separate social media account that was utilized only for professional purposes; a number of educators have begun the practice of separating their personal and professional accounts in order to communicate with other educators, find and share best practices, and communicate with stakeholders via social media. Researchers may wish to consider how professional social media accounts may influence an individual's willingness to display a badge or credentials.

Online badging systems allowed for continued professional development opportunities for educators. Jones et al. noted that the participants in their study cited a lack of understanding of the badging system by the administrators in their schools.

According to the same study, administrators embraced digital badging systems because they placed greater visibility and transparency on the professional learning and overall development of the teachers in their buildings (2017). Diamond and Gonzalez focused on the American Social History Project (ASHP), a well-known provider of professional development to New York City public schools. The organization planned a free, online badging program to note the achievements of teachers who met the requirements during professional development (2014). The badge system used in within the ASHP framework was unique in comparison to other badging systems in that teachers were awarded badges for fulfilling simpler prerequisites while other badges necessitated that teachers demonstrated mastery (Diamond & Gonzalez, 2014). Another distinction within the ASHP badging system was that all badges were interrelated. Each badge represented a part of a larger contextual framework that the creators intentionally built to ensure that participants were engaged in meaningful professional development that was not perceived to be a stand-alone learning experience for the educator (Diamond & Gonzalez, 2014).

Jones et. al found that teachers were often unsure of how to utilize the badges. The team conversed with participants, received feedback, and then informed participants how digital badges could be used and displayed (2017). Diamond and Gonzalez suggested that teachers utilize digital badges as components of their teaching portfolio (2014). Teaching portfolios acted as a means for reflection by both the administrative evaluator and teacher, which assisted the teacher in growing professionally in the areas of instruction and pedagogical skills. Within their research, Diamond and Gonzalez compared the badging system created by ASHP with the National Board Certification

program, which focused upon "high-quality ... competency-based targets because they are tied to widely recognized competencies" (2014, p. 13). The Diamond and Gonzalez study (2014) made the recommendation to have greater support in the online platforms for teachers who attempted to earn badges. Allowing for greater interaction between an instructor or the individual authorizing the badge was a recommendation at the conclusion of the study.

When creating or utilizing a digital badging system, the research from the aforementioned studies suggested that badges should be carefully chosen or created to fit the school system's vision and mission. Otherwise, digital badges may be perceived by teachers as stand-alone professional development that does not directly impact their daily teaching practices. Teachers should be able to demonstrate competency at various levels to earn badges; they should relate what has been learned to their teaching practices. Administrators should have knowledge of the purpose of digital badges and be able to identify the minimum requirements needed to earn a digital badge. Offering online or face-to-face support to teachers who attempted to earn digital badges seemed to be beneficial. Otherwise, teachers faced frustration with the experience, which could have led to diminished learner motivation.

Teacher Perceptions Regarding Preparedness for Technology Integration

Teachers' pedagogical beliefs greatly impacted their perceptions regarding their own preparedness to integrate technology. Engagement in professional learning opportunities decreased in teachers who viewed technology as a hindrance in comparison to "tried and true" teaching methodology, and these teachers may have perceived themselves as being underprepared to integrate technology. This teacher-centered

approach may have emphasized "discipline, subject matter, and moral standards. The teacher acts as an authority, supervising the process of learning acquisition and serving as the expert in a highly structured learning environment" (Tondeur, vanBraak, Ertmer, & Ottenbreit-Leftwich, 2016, p. 557). The likelihood that an individual perceived technology integration as being impactful in the classroom decreased when a teacher perceived the "sage on the stage" as the best instructional model, and the teacher's perception of their own preparedness and the need for technology may be correlated. Tondeur, vanBraak, Ertmer, and Ottenbreit-Leftwich "suggested that because most teachers' personal learning experiences were predominantly through direct instruction, they believed that technology was not essential to teaching and learning" (2016, p. 562). The authors go on to posit that "teachers with student-centered beliefs tend to emphasize individual student needs and interests, and typically adopt classroom practices associated with constructivism and/or social constructivism" (Tondeur, vanBraak, Ertmer, & Ottenbreit-Leftwich, 2016, p. 557). A contrasting conclusion can be drawn using this pedagogical belief: The relationship between interest in professional learning and integration increased if teachers believed that students were interested in technology and believed that technology stimulated a classroom based upon the principles of constructivism.

Brown Mayo et al. conducted a three-year longitudinal study of pre-service teachers at the University of Houston and the University of Texas. They noted a shift from utilizing technology as a means to increase teacher productivity to utilizing technology to engage learners and construct meaningful lessons. Researchers measured participants' comfort levels with technology, frequency of technology use, and efficacy,

including teaching efficacy and teaching and technology efficacy (2005). Pre-service teachers' perceptions of their comfort level with technology increased after being able to integrate specific technology into the classroom. The ability to take risks without fear of damaging equipment or software played an integral part in the teachers' ratings of their own comfort level (Brown Mayo et al., 2005). Over the course of the same study, respondents demonstrated growth in their mindset regarding technology. The focus shifted from teaching their students technology to using technology to support student learning. From the first to second year of this study, there was a 53% increase in the frequency teachers used technology as well as an increase in the role technology played in the classroom. (Brown Mayo, et al., 2005). Finally, qualitative data collected from the sample found that the more exposure and integration that a pre-service teacher had in utilizing technology, the more positive a correlation developed in regard to the individual's feelings of teaching and technology efficacy.

Tondeur, van Braak, Siddiq, and Scherer focused on pre-service teachers and their perceptions regarding their abilities to effectively integrate technology into the classroom as a first-year teachers (2016). Similarities existed between research by Tondeur, van Braak, Siddiq, and Scherer (2016) and Brown Mayo et al.'s (2005) because both focused on pre-service teachers and their perceptions regarding their abilities to effectively instruct students in general terms in comparison to experienced teachers.

The research aims of Tondeur, van Braak, Siddiq, and Scherer (2016) were to:

- develop a self-report instrument based on a theoretical model to measure pre-service teachers' perceptions of the extent to which they experience the necessary support and training in order to integrate technology into classroom activities

- use Item Response Theory (IRT) to establish a reliable scale
- explore the item difficulties of strategies to prepare pre-service teachers for technology use, which will lead to a better understanding of the support future teachers need for the use of technology in education

In comparison to veteran teachers, pre-service teacher programs placed greater focus on 21st century learning, digital citizenship, and creating authentic learning experiences utilizing technology (Tondeur, van Braak, Siddiq, & Scherer, 2016). In their meta analyses research, Tondeur, van Braak, Siddiq, and Scherer (2016) referenced other researchers and stated:

> There was a clear discrepancy between what pre-service teachers are taught in their courses and how teachers actually use technology in a real classroom … [Pre-service instruction] should not only focus on how to use technology but also how technology intersects with pedagogical and content knowledge … [and that] technology should be infused into the entire curriculum (p. 4).

In lieu of using a Likert-like scale for their research purposes, Tondeur, van Braak, Siddiq, and Scherer, utilized the Rasch model, which allowed for greater independent analysis between individuals and their perceptions of technological difficulty and ability to effectively implement their technology-based training (2016). In this particular study, the questionnaire was disseminated to 684 pre-service teachers; 74.1% of them were female, and the average age was 25. In regard to technology education, respondents were asked to rate themselves in the following areas (Tondeur, van Braak, Siddiq, & Scherer, 2016): reflecting on attitudes about the role of technology in education, learning technology by design, and scaffolding authentic technology

experiences. Pre-service teachers reported the greatest difficulty in providing electronic feedback to students and creating technology-rich lessons; this research demonstrated that more time should be spent allowing pre-service teachers to prepare, implement, and reflect on lessons involving rich technology in authentic settings such as the student teaching environment (Tondeur, van Braak, Siddiq, & Scherer, 2016). Furthermore, it can be implied that new teacher induction programs should allocate time for collaboration with veteran teachers who exemplify the use of technology in the classroom. Ongoing, structured professional development for novice and veteran teachers based upon their perceptions must be a focal point of school districts.

Ham (2010) identified four factors that participants found relevant in their perceptions of professional development: (a) formal organization, (b) content, (c) myriad of professional development strategies employed by the professional development facilitators, and (d) interpersonal dynamics and interactions. These factors directly impacted the teachers' outcomes in their perceptions of knowledge, attitudes, instructional practices, and instructional relationships (Ham, 2010).

Cervera and Cantabrana researched the impact of professional development on teachers' perceptions of their own digital competencies (2015). In their study, 22 teachers participated (Cervera & Cantabrana, 2015):

- The majority of teachers were female (86%).
- The majority of teachers were between the ages of 36-45 years old (54%).
- The teachers with the most years of experience taught between 13-20 years (41%).

Akin to the factors that Ham (2010) identified, Cervera and Cantabrana (2015) focused on the following factors in their study:

- professional development's organization (including management, educational project and curriculum development, and relationship with surroundings)
- training design (needs analysis) and methodology (collaborative groups that analyzed, reflected, and designed educational lessons)
- impact of training (whether the trainings were observed to be carried out in the classroom)

When evaluating the efficacy of the program that was implemented, Cervera and Cantabrana utilized a questionnaire to gauge teachers' perceptions of their preparedness. The professional development plan yielded positive results from the teachers. Their perceptions of their own competencies in integrating technology were based on the following aspects (2015):

- identification of the objectives and content of the different curricular areas related to digital competence (DC) work
    - 85% of the teaching staff stated they were quite competent or very competent, while only 15% answered somewhat competent.
- design of teaching-learning activities and situations for the DC work
    - 79% of the teaching staff claimed to be quite competent or very competent, while only 21% answered somewhat competent.
- selection of adequate resources and tools for teaching-learning activities
    - 79% of the teaching staff said they were quite competent or very competent, while only 21% responded somewhat competent.

- sharing experiences and working collaboratively with other teachers at the school in relation to DC
    - 64% of the teaching staff answered that they were quite competent or very competent, while only 36% answered somewhat competent.
- application of new methodologies for DC work
    - 93% of the teaching staff claimed to be quite competent or very competent, while only 7% responded somewhat competent.

Although these results yielded positive data about teachers' perceptions of their own abilities, teachers also noted that they needed greater time to collaborate with other teachers in their schools (Cervera & Cantabrana, 2015). Further research should be conducted regarding contractual obligations and scheduling, both of which may impede a district from creating an environment where in-person collaboration on a frequent basis is possible.

Tondeur, van Braak, Siddiq, and Scherer cited other constraints that may have influenced teacher preparedness regarding technology integration (2016):

- Teachers felt that they did not have adequate time to plan and collaborate with colleagues.
- Technology-integrated lessons consumed too much class time and interfered with the teaching of standards.
- Teachers felt as though they were not covering content and curriculum that may be tested on state or national exams.

The aforementioned studies demonstrated that teachers' perceptions regarding their

preparedness to integrate technology into the classroom was impacted by: (a) their pedagogical preferences, (b) pre-service programs, (c) perceptions of time constraints, (d) the ability to collaborate with peers, and (e) pressures associated with curriculum and standardized testing.

Teacher Perceptions Regarding Student Engagement and the Ability to Create Quality Content

The following research examined the perceptions teachers held regarding their ability to translate learning and create quality content correlated directly to the training in which they had engaged. Other factors that seemed to contribute to teacher perceptions were: socioeconomic status, availability to technology, resources, infrastructure, and pre-service instruction.

"Teachers' Perceptions of Technology Use in Schools" analyzed "teachers' perceptions of technology use in the classroom by surveying those who participated in the TeachUp! technology empowerment program created and developed by Digital Opportunity Trust USA (DOT USA)" (Mundy et al., 2012, p. 1). Additionally, Mundy et al. examined how factors such as: (a) teacher training, (b) socioeconomic status, (c) accessibility and availability to technology and associated resources, and (d) the infrastructure to support the technology influenced teacher perceptions concerning their own abilities to create quality content and engage students.

Teacher perceptions were affected by the abilities of teachers to readily utilize technology within their classrooms and knowing that students were able to access materials and lessons outside the school setting. For instance, educators who taught in areas of higher socioeconomic status felt greater confidence in integrating technology

because of the students' abilities to access materials (Mundy et al., 2012). Socioeconomic status generally correlated with the strength of the school's technology infrastructure as well as the infrastructure that existed in the surrounding area. When teachers could not reliably depend on the school's infrastructure or were unsure if students could complete assignments outside of school, it impacted their perceptions of the use of technology in the classroom and their willingness to create content. Another area that affected teachers' perceptions of student engagement was grade level. Mundy et al. researched secondary school teachers who integrated technology and found that they perceived themselves to be more successful in engaging students. Teachers perceived students to find web-based learning more engaging than traditional learning because it allowed for a more active way of thinking (2013). Barriers to the study included giving greater definition to the integration of content versus the quality of content and the experience and training of the teacher. Much of the research available compared the perceptions of the abilities of pre-service to in-service teachers in creating quality content.

Teachers who did not receive pre-service training in technology education tended to focus on the drawbacks of technology integration rather than the possibilities. In Baran's research, "a number of challenges related to mobile technology integration were reported, including ethical issues, lack of support, accessibility and technical limitations, insufficient experience, mobile phone bans in schools, and curriculum adaptations" (2014, p. 9). Baran described a survey administered to 467 in-service teachers regarding their positive perceptions toward mobile learning; teachers found technology and mobile learning relevant for their own learning due to its ability to assist them in accessing resources and collaborating virtually (2014). Although the perception of the sample

regarding mobile education was positive, the data does not effectively demonstrate a relationship between positive perception and the comfort levels of teachers in regard to their abilities to create quality content and further engage students. "Another survey with in-service teachers revealed that iPads helped them access learning materials, collaborate in online forums, and access email" (Baran, 2014, p. 27). Again, Baran's research did not demonstrate a correlation between the teachers' abilities to create quality content and student engagement. It merely demonstrated positive perceptions of teachers toward the integration of technology in general.

Teachers' confidence in their abilities in relation to the training that they received was a theme that appeared several times throughout the research. Mundy et al. (2002) cited a study conducted by Ertmer et. al (2007), which found that "in a study of teacher perception of the values that are needed to be an 'exemplary' user of technology in the classroom, it was found that teachers believe that a person has to be confident in his or her ability to use technology and committed to its use" (p.3).

Tom Fullerton of McGill University conducted a self-case study in which he reviewed his experiences delivering professional development in various capacities to teachers. Fullerton analyzed the perceptions teachers had when leaving his training sessions (2013). His experiences highlighted various growth models that influenced teachers' perceptions of being exemplary users and gaining more positive feelings about their abilities to create quality content and further engage students. One of the first experiences that Fullerton described was the train the trainer model, which is frequently utilized in school systems. Fullerton stated that "there was little gain in moving teacher practice forward. Not all teachers who participated felt comfortable sharing, and there

was not enough buy-in from non-participating classroom teachers" (2013, p. 444). Although it is not explicitly stated, it can be inferred that teachers' perceptions of their own capabilities in transferring the professional development they received into their own classrooms was not strong. In another position, Fullerton helped create pedagogically sound curricular materials, which were housed in an online platform and coupled with in-person workshops similar to those of the previous experience. Fullerton found that teachers were not creating new quality content of their own. Rather, teachers recreated the lessons that were available to them in the online platform and shaped them to meet their classroom contexts (Fullerton, 2013). Lastly, Fullerton discussed the utilization of school-based teams. Fullerton invited an administrator and "ped-tech" leaders, pedagogically-sound teachers who had been trained in technology, to each team. The key differences in this model compared to the others are that Fullerton required each team to form its own vision for technology integration. Teams identified their own challenges and needs and suggested ways in which the team could support technology within their schools. The teams then presented their visions to their schools (Fullerton, 2013). Fullerton utilized an inquiry-based approach instead of explicit technology instruction; his research informed the following (2013):

> I began to ask more questions than I answered. What are you trying to do or what problem are you having? What have you tried so far? I shifted the burden of teaching from me to a shared responsibility for learning. I changed my workshops from a stand and deliver model to conversations and explorations with teachers … I gave them tasks and had them work together to explore the new technology. This did frustrate some teachers who wanted quick answers, but it helped to build

> capacity as I helped them to troubleshoot on their own, to learn how to use the technology more independently (p. 445).

Fullerton found that this model increased engagement in co-planning, co-teaching, sharing, and taking risks in the classroom. In essence, to engage learners, Fullerton modeled for teachers an inquiry-based, student-centered approach that the teams wished to create in their own schools. The teams' perceptions surrounding their own learning and student learning shifted from teacher-centered to student-centered. The teams analyzed areas of need and constructively found ways to fill those gaps; they quickly became empowered problem solvers who were shifting school culture surrounding learning and its correlation with technology (Fullerton, 2013). Building a support system for teachers seemed to increase their perceptions of autonomy and abilities to create quality content based upon the needs of their learners (Fullerton, 2013).

Fullerton (2013) and Dexter et al. (2002) had similar conclusions. Dexter et al. studied the integration of computers into the classroom during the rise of educational technology (2002).

> Focusing on the teacher as a learner and as an instructional designer suggests what the school setting must provide teacher both as a workplace and as a place of learning … If teachers do not yet recognize how to operate technology and use it to leverage learning gains, they should have opportunities to learn to do so ... balanced with their other work demands and allow for them to socially construct understandings of these instructional tools … This would support their applying, in their own instructional style, educational technology to their classroom

> situation and trusting that they are making sound decisions about the use of students' precious learning time when they do so (p. 279).

"Understanding the Relationship Between Teachers' Pedagogical Beliefs and Technology Use in Education: A Systematic Review of Qualitative Evidence" (2016) by Tondeur, vanBraak, Ertmer, and Ottenbreit-Leftwich synthesized findings from various studies. The researchers examined learner agency with the teacher being the learner in technology professional development. Tondeur, vanBraak, Ertmer, and Ottenbreit-Leftwich found that successful models included: (a) individualized mentoring, (b) teacher-led teams focused upon student-centered learning, (c) collaboration between teachers, and (d) time to reflect. This model positively bolstered teachers' perceptions of self-efficacy and their abilities to create content (Tondeur, vanBraak, Ertmer, & Ottenbreit-Leftwich, 2016).

Nonprofit entity The Digital Opportunity Trust USA, (DOT USA) created and implemented a technology program for teachers in areas considered to be "high need;" this program was available to 250 K-12 public schools in Mississippi and New Orleans and provided "teachers in high need schools with one-on-one coaching and training through an intern system to accelerate teacher proficiency in the use of education technology in the classroom to boost student engagement, success, and retention" (Mundy et al., 2012, p. 3). The data collected as part of the DOT USA program demonstrated the following (Mundy et al. 2012):

> Teachers that were part of DOT USA's TeachUp! program perceived a significant increase in the areas of student engagement, student excitement, student acceleration of learning, and student proficiency with computer technology after

> the completion of the program in which they received training, coaching, and assistance in increasing the use of technology in the classroom to make their lessons more engaging and provide successful learning experiences (p. 6).

The findings of Mundy et al. reinforced previous research studies that focused on the teacher as the learner (2012).

The research regarding teachers' perceptions of student engagement and their abilities to create quality content identified several factors to consider when developing training. In order for a teacher to positively perceive their ability to create quality content, they must feel as though they are competent and have had adequate training. Their professional learning experiences should:

- be sustained over time and should not focus upon stand-alone sessions
- be inquiry-based and not be based on a direct instruction model
- involve teachers and administrators working together to create a vision for success and identify challenges and work collaboratively to solve them
- allow teachers to collaborate with colleagues and reflect upon their experiences within a school culture that does not punish those who take pedagogically sound risks when integrating technology

Teacher Perceptions of Preparedness to Design Innovative Learning Experiences

Creating innovative learning experiences for students has been perceived as a daunting task by most teachers. School systems are created with reporting measures such as standards, numerical grades, and other normative systems. Innovation has not typically correlated with traditional grading procedures.

When researching innovation, I expanded my search outside of the realm of education into the business world. I located examples of how businesses cultivated environments that fostered innovation. In an article for the *Harvard Business Review*, Greg Satell (2017) stated

> There is no one "true" path to innovation. Yet all too often, organizations act as if there is. They lock themselves into one type of strategy and say, "This is how we innovate." It works for a while, but eventually it catches up with them. They find themselves locked into a set of solutions that don't fit the problems they need to solve (p. 2).

School districts have not been immune to the problem that Satell (2017) cited; school leaders and stakeholders may have been drawn to new educational trends that did not meet the needs of the students and were not utilizing the right tools to allow for innovation to take place. According to Satell, innovation should be treated "as a set of tools that are designed to accomplish specific objectives… we need to build up a portfolio of innovation strategies designed for specific tasks" (2017, pp. 2-3). When schools seek to prepare teachers to create innovative learning experiences, school leaders must be prepared to model innovating practices to their staff members. Satell discussed Harvard Business School professor Clayton Christensen who formed the Christensen Institute, which has an area of focus on K-12 education and offers a number of free resources to educators. Christensen advised businesses that innovating products hasn't always worked; instead of innovating the product, the companies should have been innovating the business model (2017). When applying this concept to a school system,

districts need to be prepared to innovate in a variety of ways starting first and foremost in their delivery of professional learning.

Netcoh et al. described how technology changed professional development in school districts (2017). The rapid and ever-changing evolution of technology created an environment where teachers "often find themselves needing to develop and continually refine responsive strategies while teaching. The nature of this work, essentially building the plane while flying it, calls for an interactive and iterative approach to professional development (Netcoh et al., 2017, p. 25)". Netcoh et al. worked with over 25 schools and 300 educators and partnered with collegiate professional development programs and the respective middle schools that teachers worked in over a multi-year period (2017). In their graduate-level courses, teachers designed an action research project relevant to their classrooms and schools; the projects continued the teachers' professional growth and created flexibility for the integration of innovative teaching practices in their associated classrooms. Similarly, in his research, Roland vanOostveen (2017) detailed the importance that action research has had in impacting professional development amongst teachers in regard to technology education. Both Netcoh et. al (2017) and vanOostveen (2017) worked with local universities and developed teacher teams that created purposeful, inquiry-based action research plans. Pierson and Bothwick suggested that in order to facilitate change and integrate action research, "school–university partnerships can create the framework for ongoing co-research habits that will continually inform classroom practice and research alike" (2010, p. 129).

vanOosten's teams worked collaboratively, which enabled them to make appropriate decisions for their school, classrooms, and students (2017). The research of

Netcoh et al. (2017) and vanOosten (2017) began with a focus on a seemingly small-scale issues that translated to the entire population of the school. This model helped to create an environment of innovation in both studies. Satell referenced Christensen in his article for the *Harvard Business Review*; Chistensen noted that it was important to first identify the problem to be solved rather than the solutions and be open to innovation; the research of Netcoh et. al (2017) and vanOosten (2017) demonstrated these principles.

vanOosten referenced Burnaford's principles of professional development that implied improvement in teaching. The principles are as follows (2017, p. 4):

- offers meaningful intellectual, social, and emotional engagement with ideas, materials, and colleagues.
- takes explicit account of the contexts of teaching and the experience of teachers
- offers support for informed dissent
- places classroom practice in the larger contexts of school practice
- prepares teachers (as well as students and parents) to employ the techniques and perspectives of inquiry
- involves governance that ensures a balance between the interests of individuals and the interests of the institution

Two of these principles aligned closely with Satell's and Christensen's statements and seemed to be imperative in creating an atmosphere of innovation and are rooted in the business world: "offers informed dissent" and "prepares teachers (as well as students and parents) to employ the techniques of perspectives and inquiry" (vanOosten, 2017, p. 4).

Netcoh et al. (2017) cited three specific examples in which teachers empowered students to have greater accountability within their classrooms and within the larger

school context. One case study focused on the implementation of iPads into the classroom. The teacher attempted to individualize education at a higher level; students tracked their own progress, completed daily feedback forms, and assessed their own engagement. By empowering students to have greater accountability and agency within the classroom, the teacher's perception of her own capabilities grew (Netcoh et al., 2017). In another case study, Netcoh et al. (2017) cited two teachers who felt that students were disengaged in their classrooms; the teachers created a student leadership council and asked for feedback regarding content and curriculum, teaching, and the classroom environment. The teachers shared the data garnered from the student leadership council to an online platform to spur discussion with other educators in the building. One of the issues that arose through these discussions was the students' desires to be able to utilize technology more readily within the classroom; technology was a part of their daily lives, but it was not frequently used. The teachers in charge of this specific action research project realized that there was a disconnect between students' in and out of school lives; this realization allowed them to respond more effectively and spurred them to create a culture of mutual respect between students and teachers (Netcoh et al., 2017). vanOosten did not cite any specific case studies that involved data, but he related several examples of collaborative teams and the problems that they attempted to solve. The findings were similar to that of Netcoh et. al. (2017) in that vanOosten's (2017) research pointed to the role that collaboration and teamwork had in cultivating an atmosphere of innovation and change. The following is a valuable statement in reference to the research that vanOosten (2017) conducted and points to the validity of utilizing action research plans within schools.

> This action research project offered these teachers opportunities to discuss and critique their science and technology programs in professional ways. Katy built on the idea, saying that she felt "as a first-year teacher, I didn't think I would have taken the chances, the things that I have done, go for it. What have you got to lose? Just my job." The support and encouragement of the teachers in the group gave her a sense of acceptance and freedom to attempt some non-traditional teaching methods and techniques (pp. 10-11).

Creating a culture in which teachers felt freed to transform and utilize less traditional or teacher-centered approaches was an integral component in creating an environment of innovation and building positive perceptions amongst teachers. Pierson and Borthwick stated that focusing solely on professional development activities was erroneous on the part of schools; instead, school systems should focus on building a school culture focused on collaboration and problem solving (2010).

Providing students with innovative learning experiences cannot occur unless teachers have been provided with the same authentic learning experiences. The research demonstrated a clear link between embedded action research and the teachers' perceptions of their abilities to problem solve and innovate. Synthesis of the research demonstrated that problems should have an appropriate scope and are not too wide-spread or systemic in nature for an individual or small team to solve. Netcoh et al. (2017), Pierson and Bothwick (2010), and vanOosten (2017) agreed upon the importance of pairing with knowledgeable outside resources such as universities in order to better assist teachers through the process. Furthermore, vanOosten (2017) cited the importance of

having a knowledgeable facilitator. In collecting qualitative data from teachers, vanOosten (2017) found the following:

> Per the teachers, the facilitation of the project was essential…the facilitators, among other things, provided access to resources and individuals that were not usually readily available to classroom teachers. The resources (articles and other materials) provided at the meetings and through the WebKF forum were also noted as being of assistance (p. 13).

Within a school system, a knowledgeable facilitator may not exist in order to guide the process; schools should adequately assess their resources, including technology and human capital.

I was not able to locate quantitative data or research regarding teachers' perceptions of preparedness to create innovative learning experiences in the classroom; there was a great deal of qualitative data that points directly to the use of action research. Business models and educational models that utilized a team approach in identifying problems, collaborated to find and implement solutions, reviewed data, and iterated when necessary, were most likely to utilize the same approach in their classrooms with greater confidence. While this was not stated in quantitative data, it was inferred through qualitative statements that were made throughout the research. There were several clear examples in the research of Netcoh et al (2017) and vanOosten (2017) in which the teachers' abilities to problem solve bolstered their self-efficacy and self-perception regarding their abilities to create innovative practices within their classrooms. By starting on a small scale and identifying a problem that was of a more personal nature to the classroom teacher or school, the team was more likely to be able to work together

collaboratively, analyze data, reflect, and iterate until the problem was solved through the action research process. To reiterate, the process worked best when there was administrative support and a strong, knowledgeable facilitator.

Summary

I reviewed literature that demonstrated a need to further research the impact of technology professional development upon teaching practices and how those practices influence student learning outcomes. For many educators, the influx of technology and its evolving nature may be intimidating. Over the course of an educator's career, technology may have evolved from pre-service training that included using a mimeo-graph machine to integrating a flipped classroom in a 1:1 environment. Adequately preparing teachers for the insertion of new technology can be challenging. Many of the studies cited that teachers felt disconnected from the professional development their districts presented. A lack of continuity and of vision from the district to tie professional development to the vision of learning for students remains a problem; this directly impacts teachers' perceptions of their own preparedness to integrate technology effectively within their classrooms. Districts should prioritize inquiry-based learning that allows for collaboration amongst peers when creating a professional development program focused on technology integration. Introducing apps or platforms without continued practice seems to limit technology integration and the impact upon transforming student engagement, learning, and production. The climate in the building must be supportive; the professional development must be targeted; the trainers must be knowledgeable and promote innovative practices. It is clear from the literature review that teachers' perceptions of their own abilities directly impacted their willingness to integrate new technology, allow

students greater autonomy, and provide students the ability to create product-based artifacts.

When creating the intervention for this project, the lack of quantitative data was apparent. Although qualitative data is useful, I wished to implement a mixed methods research model to demonstrate change over time. The ability to examine various data sets over time more effectively demonstrates change. The lack of studies that utilized quantitative data far outweighed those that utilized qualitative data; I considered a weakness of the previous studies in respect to technology professional development. The long-standing relationship that study site's district had with Apple afforded the district with the ability to utilize teacher surveys, obtain a knowledgeable facilitator, and develop sustainable integration plans. The Apple and Apple Professional Learning surveys were chosen as quantitative data points; these surveys and the data that they yielded supplement previous research that had limited quantitative data.

Chapter 3: Methodology

Introduction

A mixed methods approach was utilized in this study; I wished to analyze quantitative and qualitative data from a sample of teachers at a suburban middle school, which will be named as the "study site". I used surveys, interviews, and informal conversations to collect data. The two quantitative data surveys administered were created by Apple and Apple Education; qualitative data was collected from the Apple Education survey and an interview I created and administered to members of the cohort.

Purpose

The purpose of this study was to determine whether targeted technology professional development increased communication, employee engagement, beliefs about change, and strategic planning amongst teachers. The climate survey was conducted by the independent education consultant, hired by the study site's district. The survey identified four major areas of concern in relation to professional learning opportunities: communication, employee engagement, beliefs about change, and a focus on strategic planning. The research questions were informed in part by the climate survey responses; the questions for the intervention are as follows:

1. How are teachers recognized for what they've learned in regard to education technology? Do teachers feel engaged in the professional learning that they have taken part in, and will a formalized recognition system within the school district help to better engage teachers?
2. How do teachers' perceptions affect how they feel regarding preparedness and professional learning and the integration of technology within their schools?

3. What are teachers' perceptions about the integration of technology into their classrooms upon student engagement and the ability of students to create relevant, product-based artifacts of learning?
4. What are teachers' perceptions of their own preparedness to design innovative learning experiences with the elements of student learning (teamwork, critical thinking, personalization of learning, communication/creation, real-world engagement)?

In reaction to the literature review and the independent education consultant's findings, it became my desire to create a targeted technology professional development model to employ at the study site. The desired outcome of the study was to show improvement in the four targeted areas surrounding the research questions. The goal of the research plan and ensuing intervention was to increase:

- teacher engagement through the implementation of a formalized recognition system
- teacher perception regarding their own preparedness and ongoing professional learning in regard to technology integration
- teacher perception of their ability to prepare and design innovative lessons that will allow for greater student engagement, production, and learning
- teacher focus on the elements of student learning

A total of 20 individuals were chosen to be a part of the Apple Cohort through the use of an application system. The application process took place during the first week of May 2019. Teachers completed a Google Form that contained the following messaging:

> If you are interested in joining a cohort of teachers from [the study site] who will engage in professional development led by CK, Senior Apple Professional Learning Specialist, please complete this form. By joining this cohort, you will engage in PD that will allow you to focus on using the native Apple iPad apps to engage your students in the classroom through hands on practice, collaboration with your peers, and guidance from CK and myself.
>
> This is an incredible opportunity; CK will be coming to the study site each month from August through January to work with this cohort. We thank the [Board of Education] BOE and administrative team for supporting this endeavor for study site.
>
> By joining this cohort, you will be helping to expand the possibilities for both you and your students, and we ask that you be open to helping your colleagues through short mini PD sessions similar to what has been led here [the study site] by high school teachers. We believe that teachers sharing ideas and teaching each other is the best possible model for educational technology professional development.
>
> Please complete this form if you are interested by Friday, May 10, 2019.

Within the form, teachers listed their name, identified their department, and explained their rationale for wishing to join the cohort.

Teachers were notified of membership in the cohort through a personalized letter (Appendix B); cohort teachers were provided an environment focused on professional learning with a Senior Apple Professional Learning Specialist, CK, and me, who served as the Supervisor of education technology for grades 6-12 in the study site's middle and

high schools. Membership in the cohort provided teachers the ability to co-plan with the Senior Apple Professional Learning Specialist and me, the chance to co-teach with one or both of us, and the opportunity partake in a reflection day to share their lessons with peers. This approach allowed the teachers in the cohort to reflect on their own teaching practices as well as the newly acquired lessons from their peers on the sharing day. Allowing teachers the ability to reflect was an integral component of the targeted technology professional development model at study site; the reflection day provided teachers the opportunity to analyze: (a) their own perceptions of technology, (b) the elements of students learning, (c) the elements of student engagement, and (d) student product creation. The cohort provided professional development based upon individual goals; teachers were recognized for the attainment of their goals using the following systems:

- the district's and school website, which used a hashtag aggregator
- social media, including Twitter and Instagram accounts
- district technology hashtag decals
- Apple Teacher certification, including the ability to display their status in their email signature or published materials

In order to gauge perception of teacher preparedness, teachers within the study site's district took surveys, which were created and disseminated by Apple, Other sources of information regarding teacher perceptions of their own preparedness came from the Senior Apple Professional Learning Specialist's surveys as well as personal interviews that were conducted with participants. This information allowed the Senior Apple Professional Learning Specialist and me to further analyze goals and progress in

meeting those goals and to adjust the goals if necessary. Lastly, the targeted technology professional development gave the ability to further analyze teacher perception regarding student engagement and the ability of students to create quality content.

At the onset of the research plan, I was employed by the study site's district as the Supervisor of education technology, 6-12. However, beginning on March 2, 2020, I officially began a new position with another local district as the Director of information and instructional technology. Through an agreement with both school districts, I was granted access to teachers, data, and other resources necessary to complete this research plan. I do not have access to the original Google Form used to select participants because my account was deactivated due to my departure from district.

Setting & Participants

The setting of the study was a middle school in Pennsylvania, which is located in suburban township. According to PowerSchool, the student information system, the school was comprised of approximately 2,200 students in grades 6, 7, and 8. The student population was comprised of the following demographics: 56% Caucasian, 20% Hispanic, 17% African American 4%, Asian, 2% Multi-racial, and 1% identified as other. The study site has been a convergence point for seven elementary schools, which have had a range in socio-economic status, demographics, and developed environments (rural, suburban, and urban). During the course of the study, several administrative changes were made, including the hiring of an interim Superintendent, the hiring of a Superintendent, the realignment of administrators within the building, including changing the head principal and reassigning administrative duties to Central Office staff to oversee the building. Through informal conversations and survey responses, teachers noted the

effects that administrative changes had upon the climate in the building and their perceptions of their own agency and responsibilities. One of the cohort members, who was an administrator in the building, took a less active role within the cohort due to her changing administrative duties.

Fifteen teachers and one administrator from the study site participated in the study. Two teachers were from the study site's high school, which is located in nearby suburban township and educates approximately 2,800 students. The school has similar demographics to that of the study site. Two teachers were participants from the elementary level; one teacher was from district elementary school "A", and the other teacher, who split her schedule, taught in elementary schools "A" and "B". The decision to include teachers outside of study site was meant to build capacity across the school district, share ideas with colleagues among different grade levels who taught different content areas, and encourage a sense of connectedness amongst staff members. The cohort members represented various content areas and grade levels at study site as well as years of teaching experience, level of education, and gender.

The Senior Apple Professional Learning Specialist, CK, was the sole collaborator in this study. CK and I collaborated to create a plan for the cohort, which included teacher-centered coaching and mentoring. Our initial conversation occurred in June 2019 with a follow-up meeting in person later that month. Within these conversations, we chose dates for coaching and discussed how to attract applicants to be a part of the cohort, how to choose members, and what methods to employ to encourage collaboration, recognition, and reflection. CK met with and provided initial training to the administrative team in August 2019. In this session, active engagement as administrators

was discussed, and team expectations for the staff and students were created. Beginning in August 2019, CK and I met with the cohort during professional development days and conducted initial trainings, which oriented the cohort members with their devices, allowed them the time to create and plan, and began the reflective process through sharing products with their peers.

Intervention & Research Plan

After conducting the initial literature review, it became apparent that the majority of studies conducted involved synchronous or asynchronous online professional development for teachers and administrators. The results contained great variability and oftentimes did not include perceptual data. As I created my research plan and the ensuing intervention, I collaborated with CK to include a period for both personal and collegial reflection among members of the cohort. It was determined of utmost importance to create an atmosphere of encouragement for teachers where their boundaries regarding teaching and learning were extended. Teachers were given opportunity to pre-plan lessons with CK or me in person, through e-mail, or any other electronic means. Additionally, an alternating schedule for teachers was implemented - half of the cohort signed up during one month, and the other half of the cohort signed up for the following month. Optimally, the entire cohort would have co-planned, co-taught, and participated in the reflection day in one cycle. However, due to budgetary constraints and the inability to acquire substitutes, it was necessary to make some modifications to the initial plan. The study site's Apple Cohort typical monthly schedule included nine to 10 teachers who signed up for a period of co-planning for day one, co-teaching for day two, and reflection for day three. Due to a substitute shortage, further splitting the cohort to meet in smaller

groups became a necessity. One substitute teacher covered half of the members during the morning session on the reflection day, and the same substitute teacher covered the remaining members of the afternoon session on the reflection day. This constraint, mainly monetarily driven, limited the teachers' abilities to further enhance cross-curricular brainstorming. However, the experience had been well-received by the teachers. Substitute teachers are required on only the reflection day; they were not required on other days because teachers used their lesson preparatory period to co-plan a lesson with CK and me in order to co-teach a lesson during a period of their choice.

The plan for targeted technology professional development focused on the four main research questions, and as collaborators, CK and I pushed teachers to move outside their comfort zones. At the onset of our first coaching cycle, as the Supervisor of education technology, I found it necessary to brainstorm, create, and share a number of initial templates. When she came to co-plan with teachers, CK and I often revised the initial concept and allowed teachers to further explore their own perceptions of technology, student engagement, and learning. By providing teachers with ongoing support and recognition, teachers felt more comfortable in expanding their boundaries. Generally, the focus was on the built-in applications on the iPad and did not veer away from the creation tools that came pre-installed. The applications included: Classroom, Clips, Numbers, iMovie, GarageBand, Notes, Keynote, and Pages. We also placed great emphasis on the accessibility and productivity tools that the iPad had so that students and teachers could fully engage in learning. These tools included split screen, voice dictation, and reader view.

Fiscally speaking, the only cost to the training that the district incurred was that of daily substitute teachers on the reflection days. Our services with Apple Professional Learning were a cost that was included in the implementation of the 1:1 program at the study site. The district of the study site had a goal to create collaborative relationships between educators, administrators, and professional trainers such as CK so that the district would be able to replicate similar experiences in the future with other cohorts at the elementary and secondary level. Another financial implication from the intervention and ensuing research plan was the ability of the district to curb spending on unnecessary or underused applications, platforms, and programs. All the lessons planned and executed were done so using the native apps and tools found on the iPad. The only other monetary investment made was the purchase of four Apple TVs and HDMI cables for the cohort to share. This purchase allowed teachers and students to project their screens. The projection system at study site was composed of a majority of wall mounted televisions with VGI cables that plugged into a teacher's laptop. The teachers needed to plug their iPad into the laptop using the lightning cable and used QuickTime to project their iPad screen, which in turn kept the teachers tethered to their desk and laptop. The Apple TVs connected to HDMI-ready projectors that the district had in stock, which allowed the teachers to have mobility in the classroom and utilize the iPad as a true mobile device. The Apple TVs also allowed teachers to display exemplars of creativity and ingenuity with immediacy during the class period. Each Apple TV had a cost of $149, and each HDMI cable costs approximately $10. The district made a $640 investment, which is set to be utilized during the 2020-2021 school year. Another investment that the district

made into the recognition system was paying for a yearly subscription to Juicer at a cost of $228 and paying for 500 hashtag decals at a cost of $238.

Research Design, Methods, & Data Collection

In order to answer the four research questions posed, I utilized a mixed methods research design. Quantitative data was collected primarily through a survey distributed by Apple and through surveys that CK administered as part of her work with Apple Professional Learning. The data from CK's surveys were both quantitative and qualitative in nature. Finally, interviews were conducted with members of the cohort in order to gain greater qualitative data regarding their experience with the targeted technology professional development executed by CK and me.

The surveys administered by Apple were of the company's own creation and were administered three times to the entire staff at study site as well at other schools in the study site's district. For the purpose of this research study, I examined the results from study site during its first year as a 1:1 iPad school. On average, the survey took between 15 and 20 minutes to complete. Although I did not know the exact questions that were asked within the survey and cannot publish them, the results implicated what was being asked within the survey itself. Due to the global pandemic, COVID-19, the data may be skewed, as the third survey may not have had as much bearing as the coaching and mentoring cycle, and the recognition system had been disrupted. Professional learning could not take place in person or synchronously. Prior to the administration of the survey, I contacted the Apple Sales Executive who coordinated with the Apple Development Executive to provide secure links to the survey, which were opened for a period of 14 days. Since the survey was property of Apple, I was not allowed to copy or replicate it,

but I had access to the survey results due to the nature of my job and their awareness of my research plan and study. The Apple survey provided information regarding the number of teachers who became Apple Teacher certified during the course of the 2019-2020 school year. This data was utilized as part of the established recognition system. Each time a teacher became Apple Teacher certified, I asked the teachers to notify me. I then tweeted the information and shared it on the study site's district Instagram account; the information was also displayed on the study site's 1:1 website. Since my departure from the district of the study site, these responsibilities became that of my successor. There was a lapse in coverage of duties due to board approval and the inability to cross-train. My successor was not a collaborator in the study, which may ultimately affect the data from the intervention.

The surveys administered by Senior Apple Professional Learning Specialist, CK, were given at the end of each intervention cycle. There were monthly survey results from August through January. The survey was created by Apple Education and was administered by the Apple Professional Learning Specialist after each of the training sessions (Appendix A). The survey used mixed methods in order to gain quantitative and qualitative data regarding the training rigor, relevance, and experience of the participant. The survey allowed participants to give anecdotal, narrative feedback to the trainer that was used to adapt or alter future trainings to best suit the needs of the participants. Participants were asked to rate the professional learning experience based on the following scale: 6 – very informative and useful to 1 – not of value to me as a professional. At the conclusion of each session, respondents were provided with a QR code that led to an online survey with the following prompts:

- Participant Role
- Learning Design
    - The Specialist created an active, hands-on learning experience for me.
    - The activities suggested provided engaging ways to use Apple technology to meet curricular goals.
    - I felt I had ample opportunity to dialogue with the Specialist about learning with technology.
    - The Specialist provided time and structure for me to reflect on and discuss how I might continue to use Apple technology in my teaching and learning.
- How do you plan to incorporate what you have learned?
- The next time I'm with an APL Specialist, I hope to learn more about these topics:
- Please share additional comments, reflections, or ideas that would improve your next experience.

There were no additional costs incurred to the district to administer the Apple Professional Learning. The number of participants varied according to the number of individuals present at each reflection day. The administrator in the cohort did not participate in any of the cycles except the administrative day in August 2019; additionally, two members of the cohort took sabbaticals mid-year, which may account for varying participation results in the data. The final source of qualitative data was an interview that took place between each of the cohort members and me; informed consent was obtained from each cohort member. The interview questions were approved by the International Review Board (IRB) in September 2019 (Appendix C). There was no cost

incurred to interview the participants in the cohort; they voluntarily completed interviews during their preparatory time, lunch, or before or after the school day. I recorded the conversations on a personal device and then transcribed them. The interview questions asked were the following:

1. What did you like most about the training? Please explain.
2. What aspects of the training could be improved?
3. How do you intend to change your practice as a result of this training?
4. How did this training compare to other trainings as far as relevancy?
5. Please share other comments or expand on previous questions if you would like.

Baseline quantitative data was available from the May 2019 survey administered by Apple. The survey directly addressed the four research questions utilized to formulate this research plan and intervention. The baseline results included quantitative data regarding the following:

1. How are teachers recognized for what they've learned in regard to education technology? Do teachers feel engaged in the professional learning that they have taken part in, and will a formalized recognition system within the school district help to better engage teachers?
2. How do teachers' perceptions affect how they feel regarding preparedness and professional learning and the integration of technology within their schools?
3. What are teachers' perceptions about the integration of technology into their classrooms upon student engagement and the ability of students to create relevant, product-based artifacts of learning?

4. What are teachers' perceptions of their own preparedness to design innovative learning experiences with the elements of student learning (teamwork, critical thinking, personalization of learning, communication/creation, real-world engagement)?

The midpoint data was collected in February 2020, and the final data set was collected in May 2020. Due to various unforeseen circumstances, which will be discussed in the following section, the results may have yielded unreliable.

Other baseline quantitative and qualitative data was collected in August 2019 from the surveys administered by Senior Apple Professional Learning Specialist. The survey was administered to the entire cohort in September 2019; in the October 2019, November 2019, December 2019, and January 2020, survey participation varied due to the coaching and mentoring cycle for that particular month. One of the cohort members, an administrator in the building, did not participate in any of the trainings after August 2019, while two other members of the cohort left on medical sabbaticals prior to the end of the cohort; each of the participants was present for the at least one coaching and mentoring cycle and the initial trainings in August and September 2019. This attrition impacted the data collected as the full range of participants did not respond.

Validity

Within this research study, a mixed methods approach was used. I obtained both qualitative and quantitative data to better answer the four research questions posed. The mixed methods approach was used to better explain the quantitative data that was obtained.

The data sets in this study may be considered a weakness to the research study itself for reasons outside of my control. During March 2020, the Corona Virus (COVID-19) affected school districts in Pennsylvania, in the nation, and around the world. For the majority of schools in the study site's area, including the study site's district, brick-and-mortar school buildings closed on March 13, 2020, for a period of 10 days. At the conclusion of this two-week period, an indefinite closure of schools was issued by the Governor Tom Wolf (Levy & Scolforo, 2020). School districts were tasked with determining a continuity of education plan since face-to-face, synchronous teaching and learning could not take place due to the restrictions of the Commonwealth of Pennsylvania and recommendations from the World Health Organization and the Centers for Disease Control. Virtual teaching and learning were thrust upon school districts, many of which were unprepared or underprepared for the call to action to implement online, virtual instruction. Additionally, during this time period, I departed the study site's district as the Supervisor of education technology, 6-12, to become the Director of information and instructional technology with another local school district. Although I was able to collect qualitative and quantitative data, the final quantitative data point may be skewed due to the COVID-19; I did not have the ability to have a face-to-face presence with the staff at the study site. To ensure that teachers had access to and took the Apple survey, I presented in a large group setting such as during a faculty meeting or at the start or finish of a professional development session. For the May 2020 administration of the survey, I needed to rely on my successor and the administrative team at the study site to distribute the link for the survey, which was a part of the service agreement offered by Apple Education in collaboration of the 1:1 iPad lease. The research question

responses may have been impacted by the nature of the continuity of education plan upon which the study site's district decided, which included a pass/fail option for the fourth marking period. Weaknesses that confounded the data include: (a) access to WiFi or a reliable hotspot, (b) inability to travel to access free WiFi or hotspots in safe locations, (c) economic and health hardships, and (d) other socioeconomic and familial issues that caused a disruption in the normative engagement teachers had observed in the brick-and-mortar setting. An unplanned variable was being thrust into a virtual environment to instruct and receive professional development. This variable may have affected that reliability of the collected data.

The quantitative data collected from the Apple survey and by the Apple Professional Learning Survey contains content validity. Both surveys were taken anonymously by participants. The Apple survey directly provided results from the population regarding the four main research questions that were posed while the Apple Specialist's survey contained even greater item validity. Although I was unable to see the actual Apple survey administered, there were results in the collected data referencing teacher roles including: subject area that the teachers instructed, level at which the teacher taught, Apple Teacher certification progress, and percentage of teachers who taught coding within the building. CK's survey contained one question regarding participant roles.

Within the Apple survey, questions were asked regarding the teachers' sense of preparedness for teaching with technology. Nine questions were asked within this category, which included data with the following prompts:

- designing lessons that engage students in the real world

- students creating products to demonstrate and share their learning
- fostering creativity and enhancing productivity
- making learning personal for every student
- managing iPad devices during student learning experiences
- using problem solving to support critical thinking
- building foundational skills around using technology for learning and teaching,
- designing teamwork lessons beyond simple collaboration
- integrating coding into your curriculum

Within CK's survey participants rated their professional learning experience, which had criterion validity with the topic of teacher preparedness.

The next section of the Apple survey detailed teacher perception of technology and included eight data points including the following prompts:

- Technology makes it easier to manage my students' grades.
- Students create more professional-looking products with technology than with other traditional media.
- Technology makes it easier to manage my classes' assignments and projects.
- Students put more effort into their assignments when they use technology.
- Technology helps students to grasp difficult concepts in your curriculum area.
- Students are more likely to remain on task if they're using technology.
- Students are able to manage their own learning with technology.
- Students interact with each other more while working with technology.

CK's survey included the following rated responses regarding learning design:

1. The specialist created an active, hands-on learning experience for me.

2. The activities suggested provided engaging ways to use Apple technology to meet curricular goals.
3. I felt I had ample opportunity to dialogue with the Specialist about learning with technology.
4. The specialist provided time and structure for me to reflect on and discuss how I might continue to use Apple technology in my teaching and learning.

The next section of the Apple survey detailed teacher perception of elements of learning by frequency. The five elements of learning are teamwork, critical thinking, personalization of learning, communication and creation, and real-world engagement.

The final area of the Apple survey provided data regarding the frequency of product-based learning. Product-based learning included:

- pictures or artwork
- multimedia presentations
- multimedia reports, term papers, and eBooks
- graphs or charts
- videos or movies
- web-based publications
- physical products such as 3D printed objects
- webpages, apps, or other projects requiring coding

CK's survey and my interviews contained descriptive validity and evaluative validity. I conducted the interviews with the cohort. To avoid any bias in the future and to have greater interpretive validity, I would recommend that another individual conduct

interviews with the participants in the study. The qualitative questions and statements included in CK's survey were:

1. How do you plan to incorporate what you have learned?
2. The next time I'm with an APL Specialist, I hope to learn more about these topics.
3. Please share additional comments, reflections, or ideas that would improve your next experience.

During my interview, I asked participants to respond to the following prompts that were approved by the IRB:

1. What did you like most about the training? Please explain.
2. What aspects of the training could be improved?
3. How do you intend to change your practice as a result of this training?
4. How did this training compare to other trainings as far as relevancy?
5. Please share any other comments or expand on previous responses.

Summary

After examining the quantitative data from the Apple survey, there appeared to be a positive correlation between the intervention conducted and the data; the intervention created and implemented was based upon the literature review and research. The preliminary qualitative data also appeared to show a positive correlation between the intervention and teacher perception; however, there was no baseline qualitative data with which to compare teacher responses with from May 2019.

In May 2019, study site had 101 respondents to the Apple survey: 2% were Apple Teacher certified, 7% were working on their certification, and 91% had yet to begin the

certification process. In March 2020, the study site had 94 respondents to the Apple survey: 21% were Apple Teacher certified, 21% were working on their certification, and 57% had yet to begin the process. Over the course of 10 months, there was a 19% increase in Apple Teacher certification, and there was a 14% increase in teachers who had begun the process to become Apple Teacher certified. When comparing the results regarding teachers' sense of preparedness for teaching with technology from May 2019 to March 2020, there was a slight increase. The data from the March 2019 survey demonstrated that approximately 67% of the 101 teachers responded that they felt moderately to very prepared. The data from the May 2020 survey demonstrated that approximately 70% of the 94 teachers felt moderately to very prepared.

The ensuing data and its analysis accounted for a number of unplanned variables that confounded the data. During this time period, I dislocated my elbow and was unable to work for several weeks in a face-to-face format or virtually under medical advisement. I departed the study site's district as the Supervisor of education technology, 6-12, to another district as the Director information and instructional technology. Finally, the global COVID-19 pandemic ensued, which has impacted schools across the study site's region, state, nation, and world. These variables will be discussed in greater depth in the final section of the paper in the data analysis.

Chapter 4: Data Analysis and Results

Introduction

The results from the study came from a number of sources and included qualitative and quantitative data sources. The mixed methods approach was effective in this particular study in order to provide better insight into the responses from the respondents and to explain change over time. The four research questions were addressed by the multiple sources of data, including the Apple survey, the Senior Apple Learning Specialist survey, and an interview that I conducted. The four targeted research questions that I addressed in this project are as follows:

1. How are teachers recognized for what they've learned in regard to education technology? Do teachers feel engaged in the professional learning that they have taken part in, and will a formalized recognition system within the school district help to better engage teachers?
2. How do teachers' perceptions affect how they feel regarding preparedness and professional learning and the integration of technology within their schools?
3. What are teachers' perceptions about the integration of technology into their classrooms upon student engagement and the ability of students to create relevant, product-based artifacts of learning?
4. What are teachers' perceptions of their own preparedness to design innovative learning experiences with the elements of student learning (teamwork, critical thinking, personalization of learning, communication/creation, real-world engagement)?

Data Analysis

I utilized the quantitative data results from the Apple and Apple Professional Learning Specialist's surveys. The Apple survey was useful in providing data regarding the population but was limited in producing data specific to the intervention group because the survey was completed anonymously. I compared the data points for correlational statements or questions. This allowed me to make inferences from the data regarding the intervention. I found the quantitative data to be useful, but the qualitative data further explained the success of intervention. As the timeline progressed, qualitative data from cohort teachers referenced the expectation, support, and recognition systems created and implemented.

Results

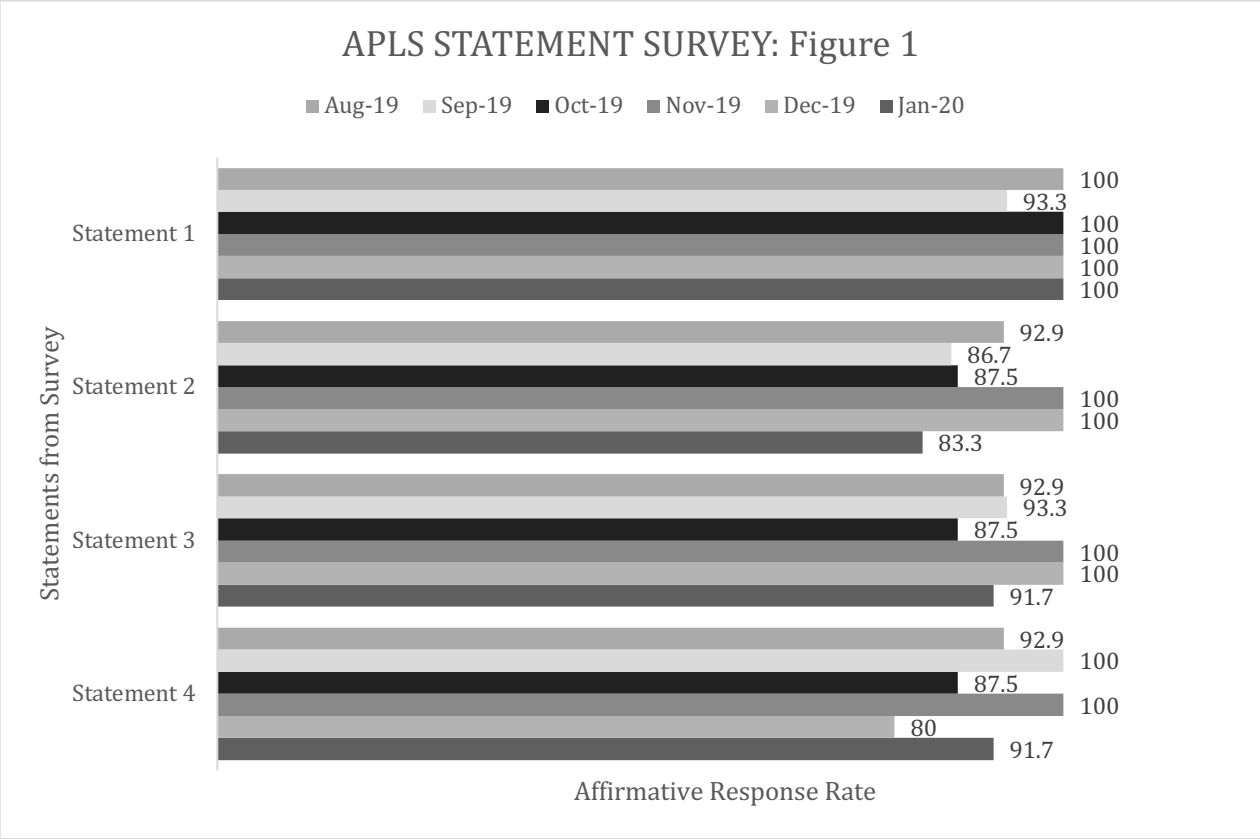
In comparing the data points from the three Apple surveys administered at the study site, the data demonstrated positive trends regarding teacher recognition. Over the course of one year (May 2019-May 2020), the teachers at the study site showed an increase in Apple Teacher recognition. Within the course of the year, the amount of Apple Certified teachers grew from 2% (May 2019), 21% (March 2020), to 29% (May 2020). As a form of recognition, teachers were able to add their Apple Teacher status to their school email addresses and social media accounts. While employed with the district of the study site, I recognized teachers on social media accounts (Twitter and Instagram) as well as the district and study site's websites. The number of respondents varied per survey; the following indicate the number of respondents who took the Apple survey: 101 (May 2019), 94 (March 2020), and 76 (May 2020). The variance in results will be discussed in the conclusion section.

The qualitative data suggests that the teachers felt engaged in professional learning opportunities. CK, the Senior Apple Learning Specialist, administered a survey at the conclusion of each session she had with teachers. The surveys were administered in August 2019, September 2019, October 2019, November 2019, December 2019, and January 2020. The number of respondents varies due to the type of training offered: whole group cohort or split cohort. Teachers ranked the following statements from 1 to 6 (not helpful to me at all to very informative and useful):

- S1) The Specialist created an active, hands-on learning experience for me.
- S2) The activities suggested provided engaging ways to use Apple Technology to meet curricular goals.
- S3) I felt I had ample opportunity to dialogue with the Specialist about learning technology.
- S4) The Specialist provided time and structure for me to reflect on and discuss how I might continue to use Apple Technology in my teaching and learning.

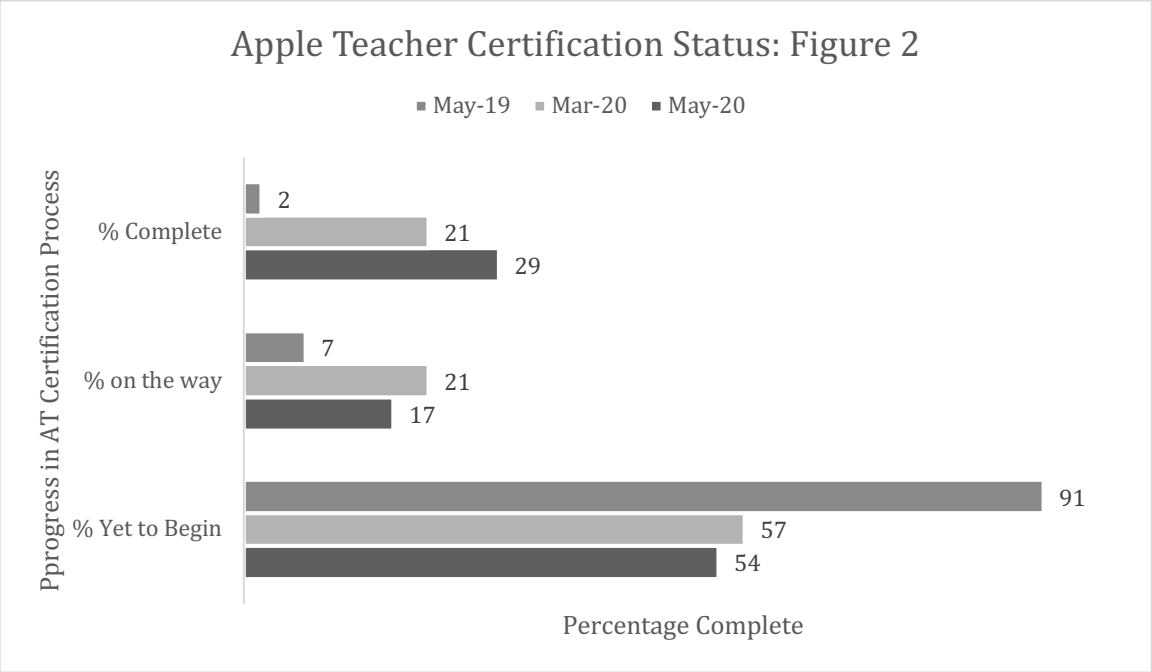
Figure 1 shows cohort responses over the course of the six engagements with CK and served as a data point for the second part of the first research question regarding whether teachers feel engaged in the professional learning that they had taken part. In August and September 2019, the whole cohort met for training; in the following months, October 2019-January 2020, the cohort met in smaller, split groups. The data regarding professional development administered by CK yielded positive results by those in the cohort. The lowest data point within the set of statements was 80% for the fourth statement in December 2019; incidentally, the number of cohort members that met during

this cycle was significantly smaller than other cycles. Teachers cited the timing of CK's visit to the study site as a deterrent for signing up for that cycle.

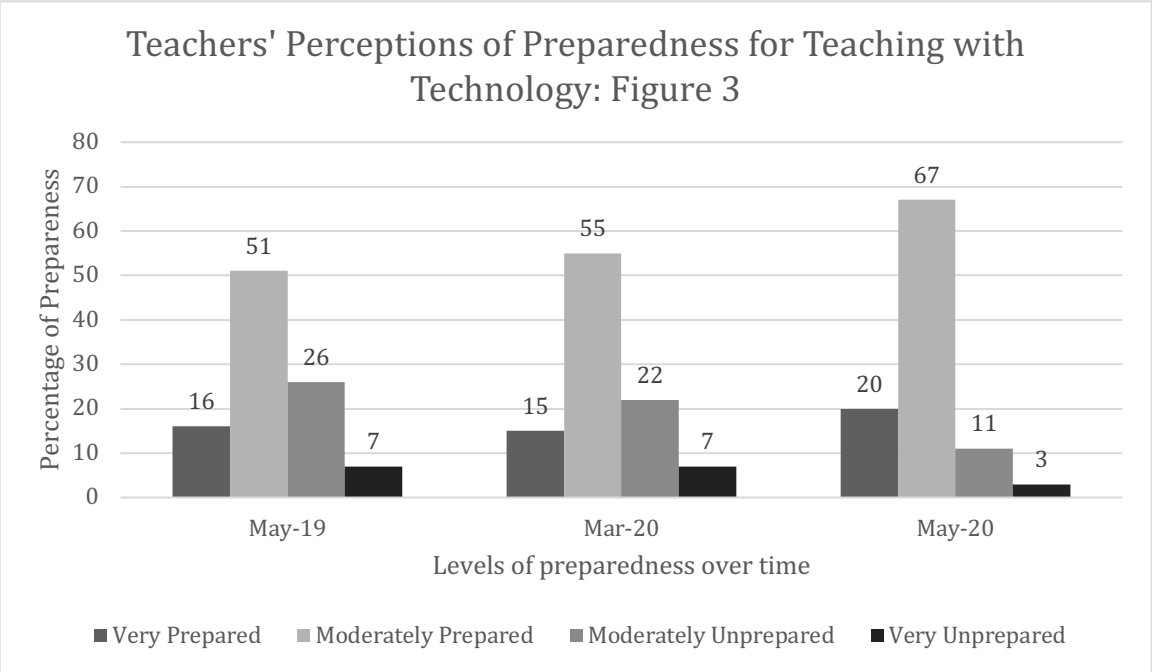


Data from the Apple survey helped to answer the final part of the first research question regarding a formalized recognition system, which was meant to better engage teachers. In May 2019, prior to the start of this research project, there was no formal recognition program in place for teachers who had completed Apple Teacher certification or any other technological certification; social media and the website were primarily used to feature student accomplishments. With the implementation of the intervention, social media and website recognition, the number of teachers within the study site who completed and started the Apple Teacher certification program demonstrated growth. At the start of the 2019-2020 school year, teachers were encouraged to complete their Apple

Teacher certification for their professional learning. This intervention demonstrated a decrease in teachers who had yet to begin from 91% in May 2019 to 54% in May 2020.



The second research question involved teachers' perceptions regarding preparedness and the integration of technology within their school. The May 2019 and March 2020 survey data demonstrated little variance. Of the entire population at study site, 16% of teachers felt very prepared in May 2019, 15% of teachers felt very prepared in March 2020, and 20% felt very prepared in May 2020. Figure 3 demonstrated the teachers' perceptions of their own preparedness for teaching with technology according to the Apple survey. The overall change in teachers' perceptions of their own preparedness (very prepared to moderately prepared) increased from a total of 67% (May 2019) to 70% (March 2020) to 87% (May 2020). The incidence of COVID-19 could have affected teachers' sense of preparedness for teaching with technology in the May 2020 responses in comparison to earlier responses.



The results from the Apple Professional Learning Survey, which was administered to cohort teachers, reflected growth in comparison to population of teachers at the study site. The specific intervention of targeted technology professional development with a trained professional seemed to have impacted their perceptions regarding their preparedness, professional learning, and integration of technology into their classrooms as evidenced by the responses provided. The Apple Professional Learning Survey asked teachers, “How do you plan to incorporate what you have learned?”. This question correlated to their self-perceptions and feelings of preparedness regarding technology integration. Below are some sample responses from the survey. There was a noticeable change from August 2019 when teachers focused upon exploration, baby steps, and implementing technology into small sections of their lessons to January 2020 when teachers speak of moving out of their comfort zone and using technology on a regular basis within their classrooms. Some of the responses touched

upon the third research question regarding teachers' perceptions about technology integration, student engagement, and student creation.

Table 1

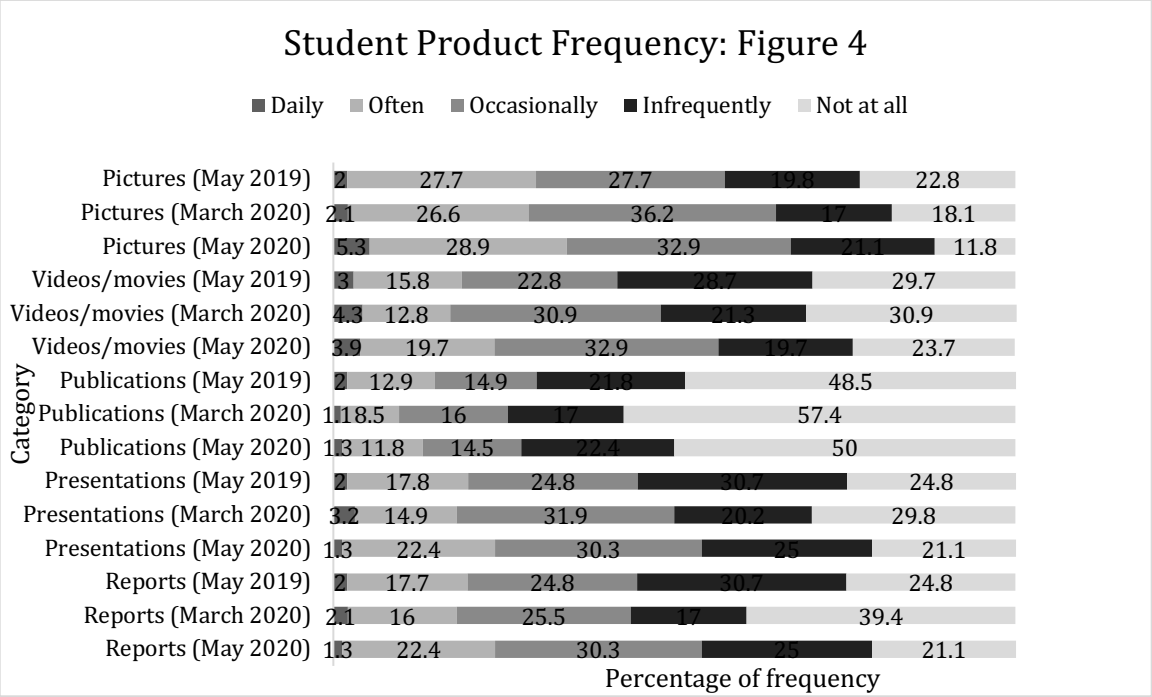
Teacher preparedness and technology integration

Qualitative Result	Example Quotes
September 2019 When the role of the teacher was solely that of a learner, their perception of their own preparedness to implement technology took a more teacher-centered approach.	I will implement what I learned through direct, hands-on technology project work with my students. Creating books to teach as well as having my students use it to share they learn. Making books for every unit, creating templates for student projects. I want to make some templates in Pages to have students show their mathematical thinking process for decimals.
October 2019 After having one experience with the intervention (co-planning, co-teaching, and reflecting with peers), teachers' perception of their preparedness to implement technology took a more student-centered approach.	I plan to continue the project I started with my class and even expand the lesson into other areas. I also learned a lot of new tips and tricks as well as incredible ideas to incorporate into my classroom. I will continue to incorporate the ideas we learn about. I'm so excited to start the My Country book with my students. I'll be using a Pages template. I feel inspired. Using Clips as a tool to do quick introductions, delve into kids' prior knowledge, and see where they want to go in the future.
November 2019 After having one experience with the intervention (co-planning, co-teaching, and reflecting with peers), teachers' perception of their preparedness to implement technology took a more student-centered approach.	To plan lessons focused on student thinking and not on time constraints. I'm ready to try it more and more. That is big for me to start planning new ideas of using these new tools in my classroom. I would like to have more self-discovery with my students and allow students to understand what they are learning and why without always being graded.

Qualitative Quote	Example Quotes
December 2019 After having two experiences with the intervention (co-planning, co-teaching, and reflecting with peers), teachers' perceptions of their preparedness to implement technology continued to grow; teachers expressed the desire to take more risks with technology integration.	Hoping to continue with new ideas and new projects. I use the application for meaningful instruction while eliminating the need for traditional supplies. After our time-sharing ideas with each other, I feel much more comfortable trying new ways of presenting, discovering, and learning using the iPads. I plan to use the ideas presented by other teachers and [CK] into my curriculum. I hope to use AR Makr for a student-created scavenger hunt for geometric shapes. Love the ideas and outside the box thinking.
January 2019 After having two experiences with the intervention (co-planning, co-teaching, and reflecting with peers), teachers' perceptions of their preparedness to implement technology continued to grow; teachers expressed the desire to take more risks with technology integration.	I now know how to use the iPad to its fullest potential and plan to use Apple native apps with my students on a regular basis. I did not know how to use many Apple apps until this cohort and mostly stuck to Google. I'm much more comfortable using the iPad now and Apple products. I was reluctant at first because it's out of my comfort zone. Our specialist not only shared information, she made it come alive. She personally connected with each person and made sure it was useful ad not only applicable but fit into your teaching style. She encouraged growth through challenging each of us to step out of our comfort zone. I have been able to try so many new things each and every day. Create learning opportunities for my students that not only increase their knowledge, but also lead to their exposure to and finesse with technology. In this way, I hope to inspire them to continue to integrate technology into the products that they create that demonstrate their understanding.

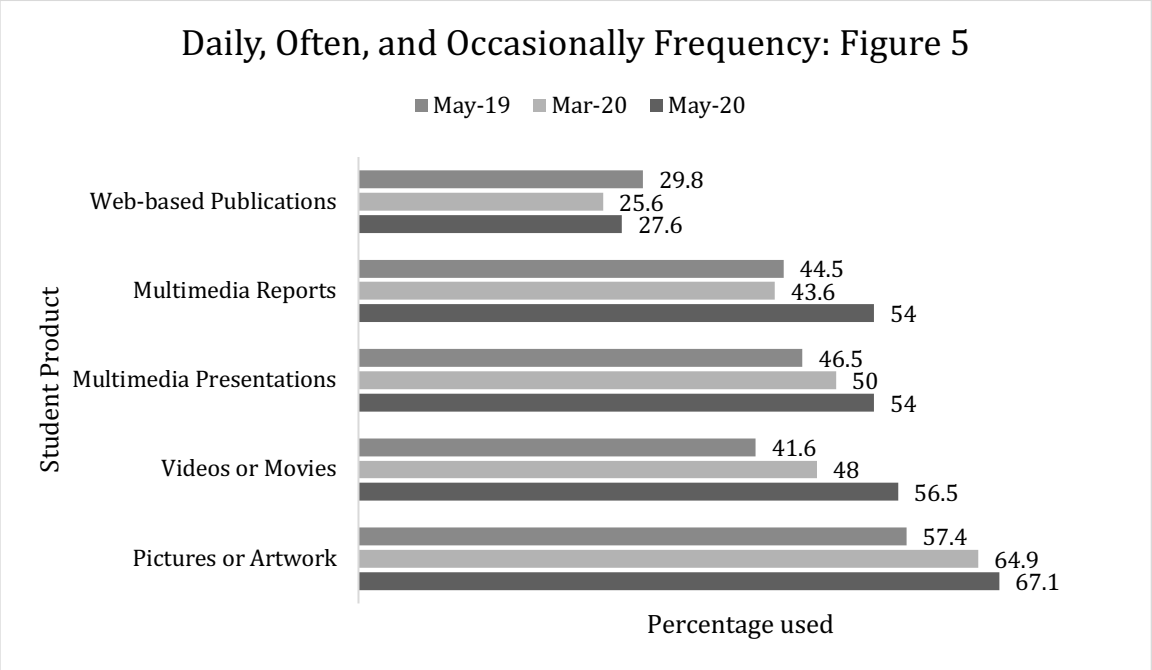
The third research question focused on teachers' perceptions and how they affected their feelings regarding their own preparedness, professional learning, and the integration of technology within their schools. The data compiled by the Apple survey focused on the frequency with which students produced certain products within their classroom, which directly correlates to the teachers' own comfort levels and preparedness to incorporate such experiences into their classrooms. Abbreviated titles of the five categories which are compared in Figure 4 were:

- Category 1: Pictures or Artwork
- Category 2: Videos or Movies
- Category 3: Web-based Publications
- Category 4: Multimedia Presentations
- Category 5: Multimedia Reports



The schoolwide results from the Apple survey demonstrated focus upon using visual mediums to allow students to have greater choice in exhibiting their knowledge and creativity within the classroom.

The results demonstrated that certain products were used at a higher frequency than others as inferred by the professional learning opportunities offered to the staff. When tallying the daily, often, and occasionally student frequency of the aforementioned categories, there seemed to be an apparent comfort level of teachers, which appeared in the data displayed in Figure 5.



The Apple Professional Learning Survey asked teachers to share what they would like to learn the next time they meet with the Apple Professional Learning Specialist. Their responses showed a correlation between their own learning and wishing to keep students engaged in class to create artifacts of learning. Some of the answers in Table 1 demonstrated perceptions regarding student engagement and creativity in addition to the responses found in Table 2.

Table 2

Teacher Learning Desires, Student Engagement & Artifacts

Qualitative Statement	Example Quotes
August 2019 When the role of the teacher was solely that of a learner, teachers tended to focus upon their own teaching rather than student engagement and creativity.	Apply more to content. I would like to learn more about the specific Apple apps and how to easily incorporate them into my classroom. More project-based ideas Clips, iMovie, providing information to students.
September 2019 After having one experience with the intervention (co-planning, co-teaching, and reflecting with peers), teachers focused more on apps and began to focus on student learning.	Just using all these awesome tools in my math classroom and enhancing the students' learning. iMovie and more ways to integrate into the classroom. Other ways to implement this technology into the ELA classroom. More about various apps and tools to use specifically in history/geography classrooms. Keynote!
October 2019 After having one experience with the intervention (co-planning, co-teaching, and reflecting with peers), teachers continued to focus on apps and began to focus on student learning.	Animating in Keynote and other real-life applications. Screen recording and new apps I do not currently use. Besides templates and books, how else can I use Pages in my classroom. What are other easy ways to incorporate them More about Keynote and Pages; I'm a little inept with Apple products. Continue sharing ideas with colleagues.

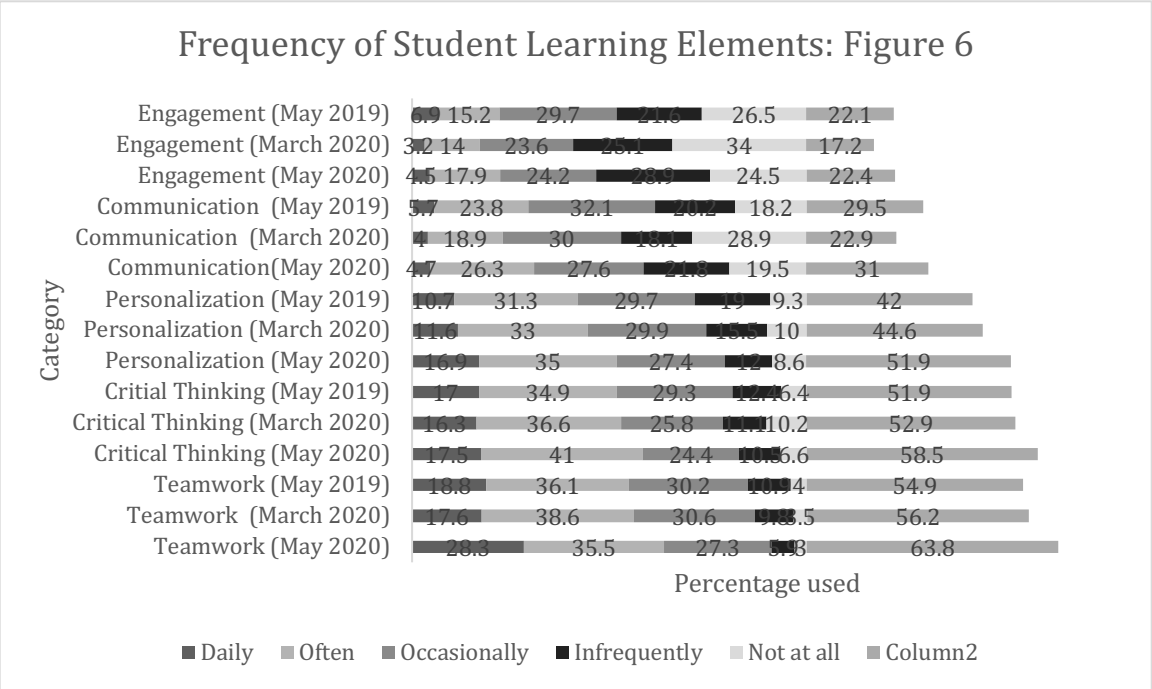
Qualitative Statement	Example Quotes
November 2019 After having one experience with the intervention (co-planning, co-teaching, and reflecting with peers), teachers continued to focus on apps and began to focus on student learning.	Continued growth of utilizing technology in the classroom. New ways to incorporate the iPad to engage and enhance student learning. Additional apps or ways to integrate. At this point, I have a pretty good understanding of many apps, but always looking for creative exercises and ideas of how to incorporate.
December 2019 After having two experiences with the intervention (co-planning, co-teaching, and reflecting with peers), teachers began to focus on application, out-of-the-box thinking, and real-world engagement.	Anything, I love the new ideas and outside the box thinking. Screen recordings for student instruction. I wish she wasn't leaving us.
January 2019 After having two experiences with the intervention (co-planning, co-teaching, and reflecting with peers), teachers began to focus on application, out-of-the-box thinking, and real-world engagement.	I would like to continue learning how to use programs like Clips, Pages, and Keynote so that I can lead students in using them. Familiarize myself more with Pages; using GarageBand to podcast. Keynote and numbers and how I can use it more in my lessons. I'm still trying to master Google products, Pages, and Clips. I'm not sure what else is out there, but I'm excited to learn. 3D printing, CAD, cam applications that are applied to reality.

The survey responses demonstrated the teachers' desires to learn about specific apps and platforms, and some teachers referenced their own comfort level regarding their ability to lead instruction with their students. The teachers' perceptions of their mastery of skills correlated to the frequency in which they created lessons that were focused upon student

engagement, which provided opportunities to students to create relevant, product-based artifacts of learning.

The final research question focused upon the teachers' perceptions of their own preparedness to design innovative learning experiences with the elements of student learning. The Apple survey directly provided quantitative data regarding teacher perception of the frequency of student learning concerning the five aforementioned elements of learning. There was a correlation between the teachers' perception of preparedness in designing an innovative lesson and the frequency in which students' learning of said elements was reported. The five measured categories were:

- Category 1: Real-world engagement
- Category 2: Communication and creativity (name is shortened in Figure 6)
- Category 3: Personalization
- Category 4: Critical Thinking
- Category 5: Teamwork



Many of the responses listed in Tables 1 and 2 reflect the teachers' perceptions of their preparedness to create innovative lessons. Although qualitative data was not available from the entire school, the cohort provided a great amount of information about their sense of preparedness with the intervention of targeted technology professional development. Surveying the teachers individually allowed each member to more fully express their experiences as compared to completing a Likert-like scale survey.

Prior to leaving the study site's district, I collected informal data from the teachers in the cohort as well as from those who were not. The teachers appreciated recognition, time to collaborate, feedback, in-class support, and the ability to work with a knowledgeable professional. Additionally, meeting with each teacher in the cohort to co-plan their lesson provided a unique opportunity to communicate, problem-solve, create, and empower teachers. I met with the majority of the teachers in the cohort prior to leaving the district; there were some circumstances that made it impossible to collect data

from all members. Two teachers took sabbatical; the principal stopped participating after the August training; two teachers had scheduling conflicts that precluded them from completing the interview. Table 3 is synopsis of the responses that teachers provided to interview questions regarding their experience with the cohort. Teachers emphasized feelings of apprehension, excitement, preparedness, and level of confidence in the training that they received.

Table 3

Interview data from cohort members

Question	Responses
What did you like most about the training? Please explain.	Participant 1: Stepping out of my comfort zone, but with support from everyone. Participant 4: Working in small groups allowed [the researchers] to focus on individual needs. This was especially important since many were at various levels of understanding and using the iPad. Participant 11: Collaboration with [the researchers]. [They] both gave amazing feedback and gave me a direction that worked so much better. Also, the in-class support was very beneficial. I especially loved the sharing session on the third day. Participant 15: Having the opportunity and time to collaborate with colleagues, being able to learn and practice using the iPads before "going live" with students.
Question	Responses
How do you intend to change your practice as a result of this training?	Participant 6: Making my technology integration meaningful and using it to connect my kids with resources they wouldn't normally get to use. Participant 8: I have learned to trust both myself and the kids, and to not be afraid to take risks. Participant 10: I am feeling more comfortable with the idea of integrating technology more and more into all that I do, and I continually look for ways to accomplish that daily. Participant 15: The training eased a lot of the nervousness I felt about using technology and gave me confidence to try new things. This has been really beneficial with the switch to online learning currently in place, as my students and I are very comfortable using technology already.

Question	Responses
How did this training compare to other trainings as far as relevancy?	Participant 2: This training allowed me to apply everything I learned directly to my content and my students every time I attended. Participant 5: Much better! I loved the experience. Participant 7: It was extremely relevant since our students are 1:1 iPad. How can we teach our students to use their iPads to their fullest capabilities if we are not proficient in using the Apple Apps ourselves? Participant 13: This was one of the most useful trainings I have been part of in 17 years of teaching.
Please share other comments or expand on previous responses if you'd like to.	Participant 1: I think that empowering teachers gives way to a better climate in the building… I have seen a change from teachers coming to me all of the time with questions to feeling more comfortable with technology because they know they have peers for guidance. Participant 3: I've been teaching for 21 years, and this was the best program I've ever participated in. You created an environment that encouraged teachers to be different and aim high. The best part was the unintended directions you'd find yourself going in once creativity took hold. Participant 8: I enjoyed learning how some of the simplest tools can be used in new ways. I would love to be able to continue to learn new things and benefit from our sharing sessions. Participant 10: This type of training, learning the effective implementation of technology, would be good for more staff to be a part of. I think they would be as happy about the learning as I was.

The qualitative data provided from these interviews demonstrated a correlation between the teachers' sense of preparedness in creating high-quality, innovative lessons focused on student engagement, product-based learning, and the elements of student learning. The intervention of the cohort will be discussed in the conclusion and reflective planning portion of the paper.

Discussion

The data analysis was a lengthy process that involved the reliance upon outside sources such as Apple and CK. My position as the Supervisor of education technology, 6-12, in the study site's district, afforded me the ability to view and analyze the data. After my departure, I made an agreement with the district to access materials pertinent to this study.

When analyzing the data, I was primarily looking at anonymous survey results. Although the quantitative data was helpful and demonstrated trends in both the sample intervention group and population at study site, it could have been useful to differentiate cohort data from population data in both the Apple and Apple Professional Learning Surveys. As the researcher, I found myself interested in this information because I wanted to gain even greater perceptual data and attain greater buy-in from staff. I recognized that the likelihood of teachers honestly reporting may have diminished if they were to attribute their name to the surveys. Two primary factors in the study that allowed for participant safety were informed consent (Appendix D) and anonymity. All members of the cohort signed and returned the informed consent forms. Teachers were not fearful and seemed as though they shared their opinions honestly in the qualitative feedback. The CITI coursework (Appendixes D, F, and G) pertained to the study and helped shape the outcomes of the study through the structure and guidance provided. Additionally, The IRB review process (Appendixes H) and checklist (Appendix I) provided structure to the research study. The initial study was to include a badging system based upon a professional development program created in coordination with the local intermediate unit for secondary teachers. Planning for the professional development platform began at

the end of the 2018-2019 school year. I worked with a local intermediate unit Supervisor of education technology to an online space where teachers could choose their own learning goals for the year that could be used as a part of their professional growth portfolio. The local intermediate unit's Supervisor of educational technology created a course in Schoology, a learning management system (LMS) where the areas of focus were: (a) creating a classroom culture, (b) creating a community of learners, (c) increasing student agency, (d) utilizing instructional models that support a student-centered classroom, and (e) creating a passion project expo within one's classroom. Within these modules, educational technology tools were demonstrated, and teachers were to choose at least two of the tools to learn and utilize within their classroom to affect student growth. Examples of tech tools included: iMovie, Keynote, Clips, Photos (iOS based), Canva, Google Slides, Google Docs, Flipgrid, Scratch, EdPuzzle, paper slide videos, and digital choice boards. Teachers were allowed to choose a third option to demonstrate professional growth. The building administrators and I encouraged teachers to earn their Apple Teacher certification through the online badging system due to the integration of iPads in their schools. The principal in the cohort wished to create an online or tangible badging system for teachers but lost interest as the school 2019-2020 school year began.

Another component of the collaboration included starting a "Junior Techspert" program at the study site where the local intermediate unit Supervisor of education technology and a member of the cohort would act as co-facilitators in an advisory class focused on technology integration. The idea was formulated with the Supervisor of education technology from the local intermediate unit because of similar work she had

conducted successfully at other schools; the administrative team believed that the presence of knowledgeable, empowered students would add another layer of support within the building. The Supervisor of education technology from the local intermediate unit and I planned to have students create online tutorials for other students to recognize their achievements and share best practices with their classmates at the study site.

Ultimately, the efforts with Supervisor of education technology and the local intermediate unit were not used as data points in the intervention due to a lack of involvement and waning interest from the administrative team. The climate in the building seemed to impact many staff members, including administrators. The badging system utilizing the online platform was on the initial proposal to the IRB; I quickly realized it would be unmanageable to track alone and focused solely on the cohort.

Summary

The data from the intervention demonstrated that targeted technology professional development had a positive correlation on the four research questions. After each intervention, teachers provided qualitative data that demonstrated a shift from a teacher-centered approach to a student-centered approach. Several teachers noted that they enjoyed the collaborative time with their peers and wished they had more time to share lessons. Cohort teachers remarked that they were less afraid to take risks and move outside of their comfort zone. For instance, an elementary teacher co-planned and taught a lesson with students where they utilized several tools in order to demonstrate their geography skills. The product-based lesson incorporated Apple Maps, Sketches School, Keynote animation and voiceovers, and the creation of a movie using Keynote. When sharing the teacher's lesson, many of the other cohort members were extremely

impressed with the capabilities of the students and wished to learn more about the lesson. The vast majority of these teachers were middle school teachers, and two were high school teachers. This demonstrated the importance of cross-curricular sharing and sharing across school levels. When departing from study site, several cohort members expressed fear that the momentum they experienced in the building would end. I encouraged them to continue on their learning journey and to support their peers as they had been supported. This intervention was successful due to the atmosphere that was created, the support that was offered, the recognition that was applied, and the growth in the teachers' sense of self-efficacy that impacted their willingness to take greater chances in the classroom that allowed for student engagement, student learning, and student production.

Conclusions and Recommendations

Conclusions

The research questions determined the impact that targeted technology professional development had on educators. Often, professional development is considered in isolation of curricular and learning goals. Technology specialists are given minimal time to present professional learning opportunities; other pressing school or district matters such as curriculum revision or social emotional learning training are deemed of greater importance. Technology training is viewed as a showcase or an isolated event where teachers have minimal time with a trainer; teachers do not have time to engage in the learning, fully investigate the app or platform, discuss best practices with the trainer or their peers, and receive recognition for their attempts at integration. The fear of failure acts as an inhibitor for many teachers; they do not wish for their lesson to go awry in front of their evaluator or students. Teachers prefer to see concrete examples or lessons directly tied to their curriculum that integrate technology. Providing a "canned" lesson can inhibit student empowerment. The teacher's locus of control precludes them from considering student learning outcomes, student engagement, and specific elements of learning.

The efficacy of the intervention is apparent in the qualitative and quantitative data from the sample group, the study site's Apple Cohort. In comparison to the data from the population, the rest of the teaching staff at study site, the cohort's results showed greater growth in a number of areas, and the qualitative data helps to support this claim. Cohort members express that the targeted technology professional development was the best experience of their career; many of the respondents were in their second decade of

teaching and received innumerable hours of professional development that left little impact upon them and had no change upon their practice, according to their responses. Participant 1 remarked in her interview that "very often, we have trainings that do not help me grow professionally. Most I could have read an article and got it." Perceptual data from the start of the intervention in August 2019 through January 2020 demonstrates growth. Quantitative data collected from their experiences with the trainer does not demonstrate a great deal of variance; the qualitative data demonstrates that the cohort's perceptions and thinking changed over time.

Two major weaknesses that impact the effectiveness of the intervention include COVID-19 and my job transition. Due to COVID-19 educators were forced to alter their vision of education and lesson planning. Technology is a driving force in education, and the need for technology training is evident. As educators struggle to design effective lessons for students in a completely remote environment the need for targeted technology professional development is in greater demand.

My transition as the Supervisor of education technology, 6-12, in the study site's district to the Director of information and instructional technology in another local district is unique. As I transitioned into my new role, I met with Central Office staff members and technology integration specialists (coaches) and shared my vision for coaching and mentoring. The desire to implement a program of targeted professional development in the district that I am currently employed as the Director of information and instruction is stronger based on the cohort intervention, and the clear lack of focus that I witnessed during the following weeks of school closure in regard to technology training. Although technology coaches offer choice to teachers regarding technology in

hopes that teachers model choice to their students, there has not been a consistent focus on product-based learning, student engagement, or the elements of student learning. As I work collaboratively with district stakeholders, a more consistent focus on recognition, student engagement, product-based learning, and the elements of learning must be evident in the combining technology and curricular goals.

Planning for the future during a pandemic is difficult. The teaching staff in my current district took a wage freeze, which resulted in taking away two professional development days. As we implement new systems in my current district, SeeSaw (K-5) and Schoology (6-12), curricular and programmatic changes, and a new schedule at the high school, meaningful technology training is not at the forefront planning. Overwhelming feelings of anxiety and fear are abundant in the field of education. Board and parental pressures contrast to guidelines from the medical world, the vast majority of our time after the school closure is spent creating scenarios for our eventual re-opening with extremely limited focus on professional development.

Within my current district, I will visit each school to speak with the building leadership in person regarding our shared instructional and technology goals for the students and staff. Ideally, we will create a recognition system together that highlights the efforts of teachers on the growth spectrum regarding the implementation of technology into the classroom. It is important to highlight small strides as well as large achievements so that teachers across the district are able to identify with their peers. Consistently highlighting the proverbial standout in each school is not the most effective means to garner buy-in and to create a supportive atmosphere. Is important to recognize staff who provide the greatest reluctance to implement technology due to their fear of failure or

self-perceptions of technology inferiority. As the staff member and their colleagues gain confidence the atmosphere in the school changes.

Future plans to implement the intervention in my current district include continued professional learning opportunities for the coaches such as virtual planning and training sessions with Apple Learning Specialists, including CK. Additionally, coaches will have time to meet with me to collaborate, discuss best practices, and discuss the aspects of learning on which we plan to focus. As the coaches provided professional development to teachers at the start of the school closure in March 2020, they successfully filled knowledge gaps so theirs peers had the ability to communicate with students via Google Meet, Google Classroom, Flipgrid, and SeeSaw. They continued to offer targeted one on one coaching to teachers who needed additional assistance. As we proceeded further into the school closure, the coaches were able to build resources for students and families. Although the elements of learning and product-based learning were not at the forefront of their professional development opportunities, the coaches were able to strengthen relationships with the staff. Teachers who did not wish to integrate technology into their lessons were suddenly thrust into a fully online teaching and learning environment bringing the need for technology coaching and mentoring to the forefront. The coaches became an integral component in making the district's virtual learning environment functional. Moving forward a goal of great importance is the focus on student outcomes, including engagement, product-based learning, and elements of learning, rather than apps and platforms. Apps and platforms are useful tools in achieving outcomes, but if the connection is not made by the coach or the teacher, the training is neither targeted nor relevant.

Another successful aspect of the intervention is that teachers are able to engage with a trained professional whom they view as knowledgeable, flexible, and has the ability to support them in the planning and co-teaching the lesson. Budgetary, health, and safety concerns make it difficult to acquire a highly-qualified, on-site trainer. The intervention can be replicated very closely within my current district on a small scale in person or online. In order to do so, teachers will apply for the cohort using a Google Form. Within the form, an explanation of the model will be explained including the following components: a period of co-planning, a period of co-teaching, and a day of collaboration and sharing with peers. This cohort will run twice a year with five meetings per cohort. Ideally, it will include 10 elementary teachers per cohort, 5 middle school teachers, and 5 high school teachers. This will provide intervention to a total of forty teachers for the 2020-2021 school year. In a district that serves over 8,700 students over ten buildings, the intervention could have a far-reaching impact in one year and will help to build capacity within buildings.

The new cohort one [in current district] schedule is as follows:

- August 2020: announce the cohort, meet to explain the set up and purpose of the cohort, and set forth goals for the upcoming months.
- September 2020: co-plan, co-teach, and collaboration/sharing days
- October 2020: co-plan, co-teach, and collaboration/sharing days
- November 2020: co-plan, co-teach, and collaboration/sharing days
- December 2020: co-plan, co-teach, and collaboration/sharing days

The new cohort two [in current district] schedule is as follows:

- January 2021: announce the cohort, meet to explain the set up and purpose of the cohort, and set forth goals for the upcoming months.
- February 2021: co-plan, co-teach, and collaboration/sharing days
- March 2021: co-plan, co-teach, and collaboration/sharing days
- April 2021: co-plan, co-teach, and collaboration/sharing days
- May 2021: co-plan, co-teach, and collaboration/sharing days

Due to the fact that my current district is a dual device district, the cohort will be further split on sharing days from 20 to 10 teachers during each cycle; each device and the associated tools have varying capabilities. To have teachers share lessons and best practices on two separate devices seems impractical since the district has no intention in becoming a single-device environment from K-12.. Should the district ever change, it would require a K-12 committee with a variety of stakeholders present. Any change would likely occur over time in a methodical manner and would coincide with the refresh cycle that the district has decided on.

In my current district, grades K-2 operate on a shared iPad system, grades 3-5 have an in-class 1:1 iPad system, and grades 6-12 have a true 1:1 Chromebook system where the devices go home with the students. Due to COVID-19, the district is purchasing an additional 470 iPads to create a 1:1 iPad environment for elementary students to eliminate the sharing of devices. The devices will not remain within the elementary environment after the pandemic and its aftermath have cleared; however, when the intervention occurs within my current district, it will be in a complete 1:1 atmosphere in all grades.

After conducting some brief classroom walkthroughs prior to the COVID-19 school closure in in my current district, I was able to observe some classrooms at the high school and one of the middle schools. The 2019-2020 school year marks the first year of full 1:1 integration in my current district. The plan for device rollout was as follows: phase one occurred at the end of the 2016-2017 school year, phase two occurred at the start of the 2017-2018 school year, and phase three commenced in the 2018-2019 school year. At the start of the rollout, the district had one technology coach; during each concurrent phase, an additional technology coach was hired. The coaches have been led by a member of the Office of Teaching and Learning until July 2020; from this point forward, they will be under my direction.

As we forge ahead in my current district, it is important for coaches to understand the ecosystem that they are creating. Students need time to practice and master a skill to construct quality products. Teachers must be afforded the same opportunity to practice and master their skills in order to produce quality lessons that focus on student engagement, student production, and the elements of student learning. An environment in which teachers are not inundated by apps and platforms will provide greater support to teachers. A frequent complaint from both teachers and students is that there are far too many app and platform options; teachers are used to being the knowledgeable individual in the classroom. By reviewing the apps and platforms that the district recommends, we are presenting the best quality tools rather than an overwhelming quantity of tools. Assessing the tools that we are utilizing (either for fee or for free) via usage reports will provide us indicators of what should be made available to students and teachers.

Being pushed out of one's comfort zone in isolation is not easy for everyone; instead, having continued support through meaningful coaching, mentorship, and recognition assists in moving teachers from a structured industrial age teaching environment to one where students are allowed to engage in and enjoy their own learning process.

In order to conduct the same program within my current district, the costs will be similar to those where the intervention occurred. The district is purchasing 470 iPads, cases, and JAMF software management for a cost of $165,886.50; this is a one-time cost that will be paid with Federal Emergency Funds. An additional cost is for $8,250.00 through Apple; this cost will cover the rebuild of our JAMF management system to create a more use-friendly iPad experience. As the 1:1 rolled out in my current district, the mobile enrollment process and student configurations were determined solely by the previous Director of technology without consultation with teachers or students. As I observed a lesson in an elementary classroom during my first week at my new district, it became evident that the rebuild of JAMF was necessary for better back-end management and to make the user experience a more seamless one. Another observation I had is that iPads are used as consumer product more so than as educational tools. As my team and I sat and restored hundreds of iPads for handout to students, we realized that the students had very little product saved on their iPads, in their iCloud accounts, or in their Google Drives. Rather, students are using iPads to take Ready Math assessments and to go on various websites. When I inquired with the coaches in my current district if we could hand out Chromebooks to elementary students in lieu of iPads due to the time-consuming nature of having to restore them and ready them for handout, they affirmed that we could

in fact do so. This demonstrates to me that teachers are not utilizing the iPads for product-based learning and are not focused on the elements of learning. Although I can highly encourage coaches, teachers, and building principals to engage in free online virtual coaching with Apple Professional Learning Specialists, I cannot mandate it; I can do little more than encourage teachers to earn either Apple or Google Teacher Certifications either. Teachers in my current district do not have to complete personal professional growth plans, which I leveraged within the study site's district as a means of teachers continuing on their own professional learning journey. Additionally, within their contract, teachers and coaches have been paid for engaging in additional planning and professional development outside of the school day. At an hourly rate of over $40, the district cannot commit to offering professional development over the summer or during the next school year due to the cost it will incur.

Although there will be some fiscal implications including the purchase of additional iPads, the cost to re-engineer our JAMF software management system, and paying for daily subs for the sharing days, the cost is a minimal investment in comparison to the results that the intervention may accrue. My current district cannot afford to hire another coach at this time and will be unlikely to do so in the future. By implementing this intervention, we build capacity in teachers so that the coaches will be able to support a larger number of their peers. The cohort helped to change the climate in the building; all members of the cohort won an award from the local intermediate unit for their efforts to support their peers and students.

Although there were a number of strengths to the intervention, there are some obvious data gaps. I will create a survey and provide it to cohort and non-cohort members

to differentiate their level of satisfaction with their training, perceptions, and student learning outcomes. By creating my own surveys, I would have access to the data and would be able to better show a direct correlation between targeted technology professional development and a la cart professional development offered within the district.

Another issue with my research study is my departure from the study site's district. Shortly thereafter I dislocated my right elbow, which left me unable to report to work. If any teachers received additional Apple Teacher certifications after the start of February 2020 to June 2020 I am unaware. The data in the survey shows an increase, however, there was a shortage of participants in the final administration of the survey due to COVID-19. Teachers were asked to take the survey during a Zoom faculty meeting; however, there is 25% dip in participation. The third Apple survey data may not be as reliable as the others due to the lack of participation and surrounding events. There are a variety of reasons that the data may have increased, but the confounding nature of the pandemic can point the data in a number of directions that will never be answered. Another interesting data point in the survey is the elements of student learning by frequency. Although teachers' perceptions of their own preparedness to teach with technology increased between the March 2020 and May 2020 administrations, the five elements of student learning decreased in the same time period. There are a number of reasons this would occur: the teachers may have assigned work that students did not complete, the students may not have access to the WiFi, and the grading system may have decreased student motivation. When comparing the frequency of student product-based learning, there is an increase between the March 2020 and May 2020

administrations of the Apple survey. It is interesting to note that although the frequency in which teachers responded that students were engaging in said products (a) pictures or artwork, (b) videos or movies, (c) multimedia reports, (d) multi-media projects and (e) web-based publications, they did not feel that the elements of student learning increased. This may point to the fact that they were assigning projects and not receiving quality work back from students due to the pass/fail nature of the grading or any other number of confounding variables that cannot be clearly identified.

Another weakness of the study was the abrupt end of the cohort; members of the cohort had expressed interest in continuing the process without CK. They felt that the experience was beneficial, especially the showcase day where they were able to learn from each other's lessons, synthesize information, and further create. During my injury, I was unable to arrange for a cohort cycle to take place; after my resignation, a replacement was not hired until after the start of the pandemic and school closure, which effectively ended the cohort and the intervention.

As of March 2, 2020, I became the Director of information and instructional technology in a local district. Although I knew the decision was the best for me personally, I worried about the impact that the change in position would have upon the cohort and my Capstone project. Several members of the cohort expressed that they were fearful that the momentum that had been created would end with my departure; however, I did my best to empower them and handed off my podcast to two of the strongest members of the cohort and entrusted the remaining members to continue to support each other, their colleagues, and the students. I provided them with my contact information and have kept in touch with many of them. Additionally, one of the cohort members was

hired as my replacement and would like to keep the coaching and mentoring model in place within the secondary schools that she oversees. Although this former cohort-member is an excellent replacement, the participant had the unenviable task of both teaching and acting as the Supervisor of education technology, 6-12 for a period of time. Our transitions into our new positions paralleled each other as we both assumed our new roles in the midst of a pandemic; COVID-19 prevented my successor from continuing the work of the cohort. Additionally, I recognize that my successor is an individual and professional who has her own goals for the staff and students that she serves. Being thrust into the position in the manner that she was made it impossible to continue a coaching and mentoring cycle.

Future Implications and Directions for Research

Although there are a number of confounding variables within this research study, there are definitive results that demonstrate the need for targeted technology professional development. The quantitative and qualitative data that the cohort provided demonstrates their growth over time, and their attitudinal changes regarding their perceptions of their own preparedness and willingness to change their teaching practices to become more student-centered, choice-based, and allow for creativity within the classroom. The recognition system implemented with the staff at the study site indicates that more teachers earned their Apple Teacher certification in May 2020 than in May 2019.

The same recognition system and Apple survey were administered to the staff at study site's high school. In May 2019, 10% of teachers had completed their Apple Teacher certification and 2% had started it; in May 2020, 21% of teachers had completed their Apple Teacher certification and 10% had started it at the high school. Although the

number of respondents from May 2019 to May 2020 dropped by 16%, the increase is still large enough to demonstrate growth.

I was employed in the study site's district for 14 years and keep in contact with my successor and elementary counterpart. One Supervisor of education technology was a member of the cohort while the attended many of the co-teaching and reflection days. I have shared these recommendations to the Supervisors of education technology. The coaching and mentoring model can be implemented seamlessly as a part of the Supervisor of education technology's job requirements within study site's district. Although each Supervisor of education technology is responsible for the same number of students and staff members, the elementary Supervisor of education technology covers 7 schools, while the secondary Supervisor of education technology covers 2 schools. Having an additional supervisor or formal coaches would be optimal, but it is not impossible to mimic the same coaching and mentoring cycle throughout the study site's district. For instance, across the study site and the additional eight schools within the district, the Supervisors of education technology can ask teachers to apply to be part of a coaching and mentoring program based on the 1:1 iPad initiative in grades K-12 in the school district. If 50 teachers were chosen, and coached and mentored on a rotating basis, a large number of the teaching staff would be affected. Greater participation by the administrative team will also help to bolster teacher perception regarding their own skills and the abilities of their students to be engaged in class and create high level products. Study site cohort teachers anecdotally mentioned how pleased they were when central and building administrators would come to see their lessons and participate in the reflection day. However, as the year progressed, administrative changes occurred, and

there seemed to be less of an administrative presence during co-teaching and reflection days. Again, fiscally speaking, this targeted technology professional development seems to be a sound investment than paying for online professional development modules where the teachers experience very little engagement, receive no additional credentials, and demonstrate little to no change in their teaching practices.

The recognition of being featured on the district website and district social media seems to have impacted the rate of Apple Teacher certified teachers in the study site's district. As previously described in the literature review, Jones, et. al cite how badges can impact others' perceptions of the badge holder (2017); it can be inferred that having the words "Apple Teacher" under one's email signature can boost confidence within the person who earned the certification as well as those who view the email signature. Having a formal recognition system in place is a necessary component in created an environment where teachers feel open to meaningfully integrating technology into their lessons. Building trust and rapport with knowledgeable trainers is another essential component of the success and future implementation of this intervention. The study site's cohort believed in the intervention because of the no fail attitude and support that was provided to them. Every perceived failure was viewed as an opportunity for growth. Finally, the focus on student engagement, student choice, student production, and student learning have to be the focal points of coaching and mentoring. Technology is merely a tool; technology coaches must work side by side with building leaders and curriculum specialists to determine student learning outcomes. Technology should not be used as a time filler; technology training should not simply be a time for show and tell. If implemented correctly, targeted technology professional development will help meet

student learning outcomes, teachers' lesson goals, and provide opportunities for growth for students and staff. Engaging students in their own learning must be modeled to teachers; this intervention gives teachers the opportunity to become engaged learners who create products and also engage in the five elements of student learning (teamwork, critical thinking, personalization of learning, communication and creation, and real-world engagement). In this particular intervention, the targeted professional development models to teachers what they can replicate in the classroom. Teachers wish for students to be engaged, but offering limited to no choice inhibits student learning. The qualitative data provided by the teachers demonstrates that the personalized nature of the cohort allowed engaged them in their own learning and made it meaningful to them; for some it was the most meaningful professional development that they had ever engaged in because of the personalized nature of the training. Having the ability to co-plan and co-teach with knowledgeable trainers who are in class as supports and cheerleaders provided the teachers with a sense of confidence. Co-planning with an outside entity helps to push teachers outside of their comfort zone as well; engaging with others who are not familiar with your content area but are focused on student learning can challenge a teacher to think in new ways.

Summary

If implemented properly, targeted technology professional development can assist in changing attitudes, school climate, and culture. Offering insight to alternative methods of employing technology professional development will allow teachers to integrate curriculum, define personal goals, and focus on student learning. Although there may be an initial sense of hesitancy or feelings of anxiousness, the end results of a replicated

intervention will result in greater individual and schoolwide professional learning and recognition, increased teachers' perception of their ability to integrate technology, increased student learning utilizing authentic product-based learning, and greater focus upon the elements of student learning. CK, the Senior Apple Professional Learning Specialist, had a favorite saying, which was to "move toward the fear", and many of the cohort members took that to heart. They took risks because they knew they were being recognized, supported, and were growing as professionals to best support the students and community that they serve.

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APPENDICDES

Appendix A

Apple Cohort Welcome Letter

Welcome to the Apple Cohort of 2019 - 2020!

I am excited to notify you that you will be part of the Apple Cohort of 2019 - 2020 at [redacted]. Throughout the school year, we will work together to learn how to employ the native Apple apps to engage your students and encourage them to be better communicators, collaborators, critical thinkers, and CREATORS! As a member of this cohort, you will have the opportunity to work with [redacted], Senior Apple Professional Learning Specialist, your colleagues, and me.

Our meeting dates will include the following:

- 8/21 and 8/22
- 9/4 and 9/5
- 10/1, 10/2, and 10/3
- 11/5, 11/6, and 11/7
- 12/3, 12/4, and 12/5
- 1/28, 1/29, and 1/30

Please note that these dates reflect the time that [redacted] will be in district. You will not be necessarily meeting for full day sessions for the duration of her visits.

I applaud you for taking being a courageous teacher and serving as a leader within the school. I am positive that what you learn within this cohort will positively impact your students, your colleagues, and the overall school culture of learning a[redacted]

Sincerely yours,

Lisa J. Manzo

Lisa Manzo
Supervisor of Education Technology, 6-12
Learning Specialist

Appendix B

Apple Professional Learning Survey

Please provide the following information.

Name

Organization

Campus

Please select your role.

Please select the APL Specialist with whom you worked today.

Please rate your professional learning experience.
(6-very informative and useful, 1-not of value to me as a professional)

6	5	4	3	2	1
○	○	○	○	○	○

→

Appendix B (continued)

Apple Professional Learning Survey

Reflecting on your time with the APL Specialist, please click all that apply.

- [ ] The Specialist created an active, hands-on learning experience for me.
- [ ] The activities suggested provided engaging ways to use Apple technology to meet curricular goals.
- [ ] I felt I had ample opportunity to dialogue with the Specialist about learning with technology.
- [ ] The Specialist provided time and structure for me to reflect on and discuss how I might continue to use Apple technology in my teaching and learning.

How do you plan to incorporate what you have learned into your teaching and learning?

The next time I'm with an APL Specialist, I hope to learn more about these topics.

Please share additional comments, reflections, or ideas that would improve your next experience.

→

Appendix C

IRB Approval Correspondence

Institutional Review Board
California University of Pennsylvania
Morgan Hall, 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Lisa,

Please consider this email as official notification that your proposal titled "Targeted Technology Professional Development" (Proposal #18-079) has been approved by the California University of Pennsylvania Institutional Review Board as amended.

The effective date of approval is 9/25/19 and the expiration date is 9/24/20. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 9/24/20 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Melissa Sovak, PhD.
Chair, Institutional Review Board

Appendix D

Informed Consent Form

Informed Consent: Targeted Technology Professional Development
Interview Questions

Introduction:
Your answers to these questions may be used in a study that I am conducting for a Capstone Research Project at California University of Pennsylvania.

Purpose:
The purpose of this Capstone Research Project is to determine whether targeted technology professional development may increase communication, employee engagement, beliefs about change, and strategic planning amongst teachers. Targeted technology professional development may positively affect teacher perceptions of technology (communication and employee engagement), increase elements of student learning (employee engagement, beliefs about change and strategic planning), elements of student learning (beliefs about change and strategic planning), and increase the frequency of student product creation (beliefs about change and strategic planning).

Participant Information:
You are being invited to participate due to your involvement in the 2019 – 2020 Apple Cohort at [redacted]. The duration of your expected participation is for the academic school year spanning August 2019 – June 2020. Your participation in answering interview questions is voluntary and your responses will be kept confidential. If you choose to withdraw from this process, there will be no penalty to you as an employee of the [redacted]

Procedures:
During the course of the 2019 – 2020 school year, participants will meet with an Apple employee to receive targeted professional development. The school system will also engage in a badging system. Those receiving the independent variable will be receiving specific training from Apple; all other employees will engage in more self-directed training. All teachers will participate in a badging system. We wish to see if the placement of the independent variable will affect the dependent variable, which is teacher engagement in professional learning and the associated perceptual satisfaction that may be derived from a more targeted approach.

Records:
All records will be kept by Apple, Inc. I am unable to see individual responses from respondents to the surveys that they distribute. I will keep records of all interviews via video or audio record and will transcribe all records. The transcriptions will be used in my research project. I will have access to the original recordings; no one else will have access to them.

Appendix D (continued)

Informed Consent Form

Contacts:
If you have further questions about the research, you can contact my advisor at the following:
Dr. Peter Aiken
Email address: aikenp@calu.edu
I can be reached at [redacted].

Consent and Considerations:
If you choose to withdraw, please contact me in writing or via email to notify me that you would no longer like to participate in the research component of this study. There is no cost to participate in this study nor is there any form of remuneration.

By signing this document, you are agreeing to participate and have read the aforementioned information. This study has been approved by the California University of Pennsylvania Institutional Review Board. This approval is effective August 2019 and expires in June 2020.

Signature: _____

Appendix E

CITI IRB Basic Course Certificate

CITI PROGRAM

Completion Date 09-Sep-2018
Expiration Date 08-Sep-2021
Record ID 28340468

This is to certify that:

Lisa Manzo

Has completed the following CITI Program course:

All Researchers Applying for IRB Approval (Curriculum Group)
All Researchers Applying for IRB Approval (Course Learner Group)
1 - Basic Course (Stage)

CITI
Collaborative Institutional Training Initiative

Under requirements set by:

California University of Pennsylvania

Verify at www.citiprogram.org/verify/?w4978fd59-7153-43c9-8457-5cc226113118-28340468

Appendix F

CITI Conflicts of Interest for Project Personnel Certificate

CITI PROGRAM

Completion Date 09-Sep-2018
Expiration Date 08-Sep-2022
Record ID 28588184

This is to certify that:

Lisa Manzo

Has completed the following CITI Program course:

CITI Conflicts of Interest (Curriculum Group)
Conflicts of Interest for Project Personnel (Course Learner Group)
1 - Stage 1 (Stage)

CITI
Collaborative Institutional Training Initiative

Under requirements set by:

California University of Pennsylvania

Verify at www.citiprogram.org/verify/?w016ec9e4-7804-492c-95fa-1e89e165c1d9-28588184

Appendix G

IRB RCR Basic Course Certificate

CITI PROGRAM

Completion Date 22-Jan-2019
Expiration Date 21-Jan-2022
Record ID 28588183

This is to certify that:

Lisa Manzo

Has completed the following CITI Program course:

RCR Basic Course (Curriculum Group)
RCR Basic Course (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

California University of Pennsylvania

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wfa408f40-f0d8-494f-a4fd-20f6cccef48e-28588183

Appendix H

IRB Review Feedback

Institutional Review Board
California University of Pennsylvania
Morgan Hall, 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Lisa,

The IRB is in the process of reviewing your proposal titled "Targeted Technology Professional Development" (Proposal #18-079) the following issues have arisen:

Reviewer 1:
Study was unclear and the following questions need to be addressed:

First Developing Stage: It makes it seem that the CalU researcher will administer survey, form committee, and choose cohort.

Will researcher be administering survey or Apple rep? Is student Apple rep? Does Apple give researcher survey?
The Apple rep will be administering the survey. Links are distributed to me by the Apple rep, and then they are sent to the individual schools. I am not the Apple rep. The Apple Sales rep in coordination with the Educational Development Executive from Apple work with me to determine when to distribute the surveys that Apple has created. The surveys are open for two weeks. At the end of the two weeks, Apple provides me with the data. I do not have access to the survey once it closes. I can only see the survey when it is open am not allowed to have a copy of it as it is property of Apple, Inc.

2a. How will researcher ensure that risks are minimized? Is there potential risk? Subjects agreed to be part of the cohort. Is there an agreement included?? Informed consent for example. Are there risks?
The participants volunteered to be a part of the cohort, which entails receiving training from a Senior Apple Professional Learning Specialist. There is no risk for harm. An agreement was signed through an online form with participants. Again, there are no risks as participants may elect to remove themselves from the cohort at any time.

2b. Subject selection, appears to be previously done. Speak currently to the group researcher will be utilizing.

Appendix H (continued)

IRB Review Feedback

The group was chosen upon a volunteer basis. Teachers were told that the school, [redacted], would be utilizing the serves of a Senior Apple Professional Learning Specialist during the 2019 – 2020 school year who would focus on the native applications found on the iPad to increase student engagement and creativity.

The group contains 15 teachers from the middle schools, 2 teachers from the high school, 2 teachers from the elementary level, and 1 administrator from the middle school.

There is a mix of grade and content levels; years of teaching experience was not a consideration when choosing the cohort. The administrative team chose this group in an effort to empower leaders within different grade levels, teams, and subject areas. Teachers from other levels were included to see if they would be able to assist in building capacity at other levels who had not received training from a professional, contracted individual. An administrator, a principal at the middle school, was chosen to be a part of the cohort based upon volunteerism.

2c. What informal data will be collected by the researcher? It is unclear exactly what is being collected in this study.

The data that will be collected will primarily be from the Apple survey, which was administered prior to the start of the cohort, after finalized training (January/February 2020), and May 2020. The qualitative data will measure various aspects of Apple Professional Learning's goals.

Additionally, the school is setting up a badging system; teachers will be able to utilizing professional learning time to increase technology skills. Once proficiency is demonstrated through the submission of a lesson (taped, observed, or linked), the teacher will be awarded a badge for meeting the criteria for implementing the technology.

Finally, the researcher will collect observational data and interview participants as to their experiences with training and how it has affected their teaching.

Does researcher have permission to use data or access data sets; Or will Apple just provide cumulative findings to the researchers?

The researcher does have permission to use the data and access data sets. Linked here are the results from the May 2020 survey.

CalU researcher indicates qualitative data will be collected from interviews, observations, Apple specialist, teachers, MS admin. "Qualitative data will be collected from [redacted] and utilized to supplement the quantitative data and may assist in explaining circumstances for increased growth, stagnation/lack of growth, or a decrease in growth." What is this

Appendix H (continued)

IRB Review Feedback

qualitative data? Any questionnaires or interviews would need to be included and approved.

The training survey can be found here.

Review of badges? This was unclear.

All teachers will be allowed to focus on two to three additional technology tools as part of their professional growth plan. A course was built in collaboration with our local intermediate unit. These modules are independent learning opportunities for teachers and will not be in coordination with the Apple Cohort or Senior Apple Professional Learning Specialist. The modules are to ocus on the following areas:

1. **Creating a Classroom Culture**
    a. **All about me activity using Keynote, Photos and Clips**
    b. **Create a resumé using the Canva App**
2. **How Learners Learn Best**
    a. **Animate your name with Scratch**
    b. **Create Your Name with MicroBit**
3. **Increase Student Agency**
    a. **Flipgrid to support student voice**
    b. **Hyperdoc Choice boards to support student choice**
4. **Instructional Models to Support Student Centered Classroom**
    a. **EdPuzzle to Customize Lessons**
    b. **Paper Slide Video for Collaborative work (using Clips or iMovie)**
5. **Passion Project Expo**
    a. **Create with iMovie**
    b. **Create with Scratch**
    c. **Create with Clips and Keynote**
    d. **Create with Jeroo**
    e. **Create a Game with Code**

As a part of the part of the professional growth plan, teachers must submit evidence electronically or through formal observation of their students using the aforementioned tools. A review panel consisting of the researcher and the principal evaluator will determine if the participant has demonstrated proficiency and will be awarded a badge.

Teachers can also opt to earn badges and certifications through accredited companies such as Apple Teacher, Google Teacher certification, Nearpod, Flipgrid, etc.

CalU stated they would share and communicate results with CalU/[redacted] How is this going to be done specifically?

Appendix H (continued)

IRB Review Feedback

Teachers will submit their evidence through a Google Form for badges. The Google form will feed into a Google Sheet. Once approval is awarded, using autocrat, the teacher will be emailed a badge. If the teacher needs to demonstrate further evidence, they can resubmit.
Data from the Apple Survey can be shared electronically.

Data from the questionnaires will be transcribed and shared; interviews will be recorded if they are utilized.

Reviewer did not see informed consent attached. If the CalU researcher is interacting with the previously established Apple cohort conducting observations, qualitative inquiry or the like, there needs to be an informed consent.

The informed consent form was submitted. A copy can be found here.

Reviewer 2:
Need copy of survey

Need copy of consent form

Please respond to these issues so the Board may continue its review. Email responses (with attachments as needed) are preferred. If hard copies are submitted in response, they must be sent to Campus Box #109.

If you have any questions or comments, do not hesitate to contact me.

Melissa Sovak, Ph.D.
Chair, Institutional Review Board

Appendix I

IRB Checklist

California University of Pennsylvania

Proposal Number

Date Received

IRB Review Request

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

Submit this form to instreviewboard@calu.edu or Campus Box #109

Project Title: ***Targeted Technology Professional Development***

Researcher/Project Director ***Lisa J. Manzo***

Phone # [redacted] ***E-mail Address*** [redacted] ***or*** [redacted]

Faculty Sponsor (if researcher is a student) ***Dr. Peter Aiken***

Department ***Education***

Anticipated Project Dates ***May 2019 to August 2020***

Sponsoring Agent (if applicable) _____

Project to be Conducted at ***Easton Area School District in Easton, PA***

Project Purpose: ☐ ***Thesis*** ☒ ***Research*** ☐ ***Class Project*** ☐ ***Other***

Keep a copy of this form for your records.

Required IRB Training

All researchers must complete an approved Human Participants Protection training course. The training requirement can be satisfied by completing the CITI (Collaborative Institutional Training Initiative) online course at http://www.citiprogram.org *New users should affiliate with "California University of Pennsylvania" and select the "All Researchers Applying for IRB Approval" course option. A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training within the past 3 years and have already provided documentation to the IRB, please provide the following:*

Previous Project Title _____

Date of Previous Project IRB Approval _____

Approved, September 12, 2005 / (updated 02-11-2016)

Appendix I (continued)

IRB Checklist

Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. *Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(ses)or research questions that might be involved and explain how the information you gather will be analyzed. All items in the Review Request Checklist, (see below) must be addressed.*

2. *Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.*
   (text boxes will expand to fit responses)

   a. *How will you insure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.*

   The subjects have agreed to be a part of the cohort. I will utilize informed consent to ensure that they are aware that there data and responses may be used in order to shape future decision and may also be utilized in the research that I am conducting for my Captstone Project.

   b. *How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.*

   The selection process was based upon a volunteer process. The subjects were then chosen by a team of administrators at the selected school. The administrative team chose participants based upon subject and grade level taught and tried to include other factors such as diversity and a gender. Feelings of coercion should not exist as participants volunteered; please note that training that will be provided is not a result of this Capstone project. Rather, this training was previously approved by the district administration and building administration. Decisions regarding participants were determined prior to the approval of this project.

   c. *How will you obtain informed consent from each participant or the subject's legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.*

   When completing the survey from Apple, the survey is completed on an anonymous basis. I have no control over their particular controls. Staff members are asked to complete the survey but are not required to; having a higher population of participant completion is beneficial but not required.

   When collecting informal data, I will share an informed consent form with those I am seeking feedback from. As this is part of my professional responsibilities as the Supervisor of Education Technology, the participants should not feel as though the questions are an intrusion either.

   d. *Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.*

   The survey that is distributed and collected by Apple insures for the safety of the participants. It is an optional survey that is encouraged; however, the safeguards are put in place by Apple, Inc.

3. *Check the appropriate box(es) that describe the subjects you plan to target.*

Appendix I (continued)

IRB Checklist

3

☐ *Adult volunteers*	☐ *Mentally Disabled People*
☐ *CAL University Students*	☐ *Economically Disadvantaged People*
☐ *Other Students*	☐ *Educationally Disadvantaged People*
☐ *Prisoners*	☐ *Fetuses or fetal material*
☐ *Pregnant Women*	☐ *Children Under 18*
☐ *Physically Handicapped People*	☐ *Neonates*

4. *Is remuneration involved in your project?* ☐ *Yes or* ☒ *No. If yes, Explain here.*

5. *Is this project part of a grant?* ☐ *Yes or* ☒ *No If yes, provide the following information:*
   Title of the Grant Proposal _____
   Name of the Funding Agency _____
   Dates of the Project Period _____

6. *Does your project involve the debriefing of those who participated?* ☐ *Yes or* ☒ *No*
   If Yes, explain the debriefing process here.

7. *If your project involves a questionnaire or interview, ensure that it meets the requirements indicated in the Survey/Interview/Questionnaire checklist.*

Appendix I (continued)

IRB Checklist

4

California University of Pennsylvania Institutional Review Board
Survey/Interview/Questionnaire Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview or questionnaire?
YES—Complete this form
NO—You MUST complete the "Informed Consent Checklist"—skip the remainder of this form

Does your survey/interview/questionnaire cover letter or explanatory statement include:

[X] (1) Statement about the general nature of the survey and how the data will be used?

[X] (2) Statement as to who the primary researcher is, including name, phone, and email address?

[X] (3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

[X] (4) Statement that participation is voluntary?

[X] (5) Statement that participation may be discontinued at any time without penalty and all data discarded?

[X] (6) Statement that the results are confidential?

[X] (7) Statement that results are anonymous?

[X] (8) Statement as to level of risk anticipated or that minimal risk is anticipated? (NOTE: If more than minimal risk is anticipated, a full consent form is required—and the Informed Consent Checklist must be completed)

[X] (9) Statement that returning the survey is an indication of consent to use the data?

[X] (10) Who to contact regarding the project and how to contact this person?

[X] (11) Statement as to where the results will be housed and how maintained? (unless otherwise approved by the IRB, must be a secure location on University premises)

[X] (12) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)?

[_] (13) FOR ELECTRONIC/WEBSITE SURVEYS: Does the text of the cover letter or explanatory statement appear before any data is requested from the participant?

[_] (14) FOR ELECTONIC/WEBSITE SURVEYS: Can the participant discontinue participation at any point in the process and all data is immediately discarded?

Approved, September 12, 2005 / (updated 02-11-2016)

Appendix I (continued)

IRB Checklist

California University of Pennsylvania Institutional Review Board
Informed Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview, or questionnaire?
YES—DO NOT complete this form. You MUST complete the "Survey/Interview/Questionnaire Consent Checklist" instead.
NO—Complete the remainder of this form.

1. **Introduction** (check each)
   [ ] (1.1) Is there a statement that the study involves research?
   [ ] (1.2) Is there an explanation of the purpose of the research?

2. Is the participant. (check each)
[ ] (2.1) Given an invitation to participate?
[ ] (2.2) Told why he/she was selected.
[ ] (2.3) Told the expected duration of the participation.
[ ] (2.4) Informed that participation is voluntary?
[ ] (2.5) Informed that all records are confidential?
[ ] (2.6) Told that he/she may withdraw from the research at any time without penalty or loss of benefits?
[ ] (2.7) 18 years of age or older? (if not, see Section #9, Special Considerations below)

3. Procedures (check each).
[ ] (3.1) Are the procedures identified and explained?
[ ] (3.2) Are the procedures that are being investigated clearly identified?
[ ] (3.3) Are treatment conditions identified?

4. Risks and discomforts. (check each)
[ ] (4.1) Are foreseeable risks or discomforts identified?
[ ] (4.2) Is the likelihood of any risks or discomforts identified?
[ ] (4.3) Is there a description of the steps that will be taken to minimize any risks or discomforts?
[ ] (4.4) Is there an acknowledgement of potentially unforeseeable risks?
[ ] (4.5) Is the participant informed about what treatment or follow up courses of action are available should there be some physical, emotional, or psychological harm?
[ ] (4.6) Is there a description of the benefits, if any, to the participant or to others that may be reasonably expected from the research and an estimate of the likelihood of these benefits?
[ ] (4.7) Is there a disclosure of any appropriate alternative procedures or courses of treatment that might be advantageous to the participant?

5. Records and documentation. (check each)
[ ] (5.1) Is there a statement describing how records will be kept confidential?
[ ] (5.2) Is there a statement as to where the records will be kept and that this is a secure location?
[ ] (5.3) Is there a statement as to who will have access to the records?

Appendix I (continued)

IRB Checklist

6. For research involving more than minimal risk (check each),

[ ] (6.1) Is there an explanation and description of any compensation and other medical or counseling treatments that are available if the participants are injured through participation?

[ ] (6.2) Is there a statement where further information can be obtained regarding the treatments?

[ ] (6.3) Is there information regarding who to contact in the event of research-related injury?

7. Contacts.(check each)

[ ] (7.1) Is the participant given a list of contacts for answers to questions about the research and the participant's rights?

[ ] (7.2) Is the principal researcher identified with name and phone number and email address?

[ ] (7.3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

8. General Considerations (check each)

[ ] (8.1) Is there a statement indicating that the participant is making a decision whether or not to participate, and that his/her signature indicates that he/she has decided to participate having read and discussed the information in the informed consent?

[ ] (8.2) Are all technical terms fully explained to the participant?

[ ] (8.3) Is the informed consent written at a level that the participant can understand?

[ ] (8.4) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)

9. Specific Considerations (check as appropriate)

[ ] (9.1) If the participant is or may become pregnant is there a statement that the particular treatment or procedure may involve risks, foreseeable or currently unforeseeable, to the participant or to the embryo or fetus?

[ ] (9.2) Is there a statement specifying the circumstances in which the participation may be terminated by the investigator without the participant's consent?

[ ] (9.3) Are any costs to the participant clearly spelled out?

[ ] (9.4) If the participant desires to withdraw from the research, are procedures for orderly termination spelled out?

[ ] (9.5) Is there a statement that the Principal Investigator will inform the participant or any significant new findings developed during the research that may affect them and influence their willingness to continue participation?

[ ] (9.6) Is the participant is less than 18 years of age? If so, a parent or guardian must sign the consent form and assent must be obtained from the child

- [ ] Is the consent form written in such a manner that it is clear that the parent/guardian is giving permission for their child to participate?
- [ ] Is a child assent form being used?
- [ ] Does the assent form (if used) clearly indicate that the child can freely refuse to participate or discontinue participation at any time without penalty or coercion?

[ ] (9.7) Are all consent and assent forms written at a level that the intended participant can understand? (generally, 8th grade level for adults, age-appropriate for children)

Appendix I (continued)

IRB Checklist

7

California University of Pennsylvania Institutional Review Board
Review Request Checklist (v021209)

This form MUST accompany all IRB review requests.
Unless otherwise specified, ALL items must be present in your review request.

Have you:

[_] (1.0) FOR ALL STUDIES: Completed ALL items on the Review Request Form? Pay particular attention to:

- [_] (1.1) Names and email addresses of all investigators
  - [_] (1.1.1) FOR ALL STUDENTS: use only your CalU email address)
  - [_] (1.1.2) FOR ALL STUDENTS: Name and email address of your faculty research advisor
- [_] (1.2) Project dates (must be in the future—no studies will be approved which have already begun or scheduled to begin before final IRB approval—NO EXCEPTIONS)
- [_] (1.3) Answered completely and in detail, the questions in items 2a through 2d?
  - [_] 2a: NOTE: No studies can have zero risk, the lowest risk is "minimal risk". If more than minimal risk is involved you MUST:
    - [_] i. Delineate all anticipated risks in detail;
    - [_] ii. Explain in detail how these risks will be minimized;
    - [_] iii. Detail the procedures for dealing with adverse outcomes due to these risks.
    - [_] iv. Cite peer reviewed references in support of your explanation.
  - [_] 2b. Complete all items.
  - [_] 2c. Describe informed consent procedures in detail.
  - [_] 2d. NOTE: to maintain security and confidentiality of data, all study records must be housed in a secure (locked) location ON UNIVERSITY PREMISES. The actual location (department, office, etc.) must be specified in your explanation and be listed on any consent forms or cover letters.
- [_] (1.4) Checked all appropriate boxes in Section 3? If participants under the age of 18 years are to be included (regardless of what the study involves) you MUST:
  - [_] (1.4.1) Obtain informed consent from the parent or guardian—consent forms must be written so that it is clear that the parent/guardian is giving permission for their child to participate.
  - [_] (1.4.2) Document how you will obtain assent from the child—This must be done in an age-appropriate manner. Regardless of whether the parent/guardian has given permission, a child is completely free to refuse to participate, so the investigator must document how the child indicated agreement to participate ("assent").
- [_] (1.5) Included all grant information in section 5?
- [_] (1.6) Included ALL signatures?

[_] (2.0) FOR STUDIES INVOLVING MORE THAN JUST SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- [_] (2.1) Attached a copy of all consent form(s)?
- [_] (2.2) FOR STUDIES INVOLVING INDIVIDUALS LESS THAN 18 YEARS OF AGE: attached a copy of all assent forms (if such a form is used)?
- [_] (2.3) Completed and attached a copy of the Consent Form Checklist? (as appropriate—see that checklist for instructions)

Approved, September 12, 2005 / (updated 02-11-2016)

Appendix I (continued)

IRB Checklist

8

[_] (3.0) FOR STUDIES INVOLVING ONLY SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- [_] (3.1) Attached a copy of the cover letter/information sheet?
- [_] (3.2) Completed and attached a copy of the Survey/Interview/Questionnaire Consent Checklist? (see that checklist for instructions)
- [_] (3.3) Attached a copy of the actual survey, interview, or questionnaire questions in their final form?

[_] (4.0) FOR ALL STUDENTS: Has your faculty research advisor:

- [_] (4.1) Thoroughly reviewed and approved your study?
- [_] (4.2) Thoroughly reviewed and approved your IRB paperwork? including:
  - [_] (4.2.1) Review request form,
  - [_] (4.2.2) All consent forms, (if used)
  - [_] (4.2.3) All assent forms (if used)
  - [_] (4.2.4) All Survey/Interview/Questionnaire cover letters (if used)
  - [_] (4.2.5) All checklists
- [_] (4.3) IMPORTANT NOTE: Your advisor's signature on the review request form indicates that they have thoroughly reviewed your proposal and verified that it meets all IRB and University requirements.

[_] (5.0) Have you retained a copy of all submitted documentation for your records?

Appendix I (continued)

IRB Checklist

9

Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional (Faculty/Staff) Research

_____
Project Director's Signature

Student or Class Research

Lisa G. Mango
_____
Student Researcher's Signature

P.A.G. Ad
_____
Supervising Faculty Member's Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

☐ Approved[_____] ☐ Disapproved

_____ _____
Chairperson, Institutional Review Board Date

Approved, September 12, 2005 / (updated 02-11-2016)