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Teachers' Needs and Preferences vs. Administrators' Perceptions: Recommendations for Educational Technology-focused Professional Development Using Action Research in a Suburban High School

Lori Latham

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TEACHERS' NEEDS AND PREFERENCES VS. ADMINISTRATORS' PERCEPTIONS:
RECOMMENDATIONS FOR EDUCATIONAL TECHNOLOGY-FOCUSED PROFESSIONAL
DEVELOPMENT USING ACTION RESEARCH IN A SUBURBAN HIGH SCHOOL

by

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DEDICATION

I dedicate this dissertation to my wonderful family! My family includes my husband and two daughters, as well as my parents and my mother- and father-in-love, and my Gan-Gan! They all played a vital role in this “dissertating” process.

My husband, Bo, has had to provide me with time to research and write. This often cut into family time. I appreciate the sacrifices that he has made for me to succeed! I want to thank him continuing to support me through all my endeavors. I am eternally grateful for my soulmate! I cannot wait for us to start another adventure together.

I am so lucky to have two wonderful daughters, Kylie and Kierstyn. They have blessed my life in so many ways. My hope is that they accomplish anything they set their mind to even if it does not always happen as planned. Through hard work, perseverance, and determination, dreams can become a reality.

I do not know how I could have completed this doctoral program without the help of my mom, dad, mother-, and father-in-love (in-love because they love me like their own daughter). All four of my parents were there for me when I needed a break. I appreciate them so much. They are the best parents to Bo and me and the best grandparents for Kylie and Kierstyn. Finally, to my Gan-Gan, she is the reason that I wanted to go to college. I have always aspired to be as hard working as my Gan-Gan. Thank you for being such a positive role model for me. I love all of you!

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My Avengers writing group, Diane Lawson, Mary O’Grady-Jones, and Kristy Rykard have helped me learn, analyze, and laugh through the entire writing process. I appreciate our friendship that has been cultivated through this doctoral program.

Encouragement is all it takes to help someone achieve a goal that they thought they missed. Paula Weinspach unknowingly encouraged me to pursue my doctorate. Just one sentence, “Now it’s your turn!” has forever changed my life. Without the advice and editing from Dr. Laurie Taylor, I may not have been accepted into the doctoral program. Dr. Akil Ross has always been an inspiration to me. He was the one who helped me decide to apply for the program. I appreciate his encouragement. Many of my colleagues have helped me throughout my time in this wonderful program by assisting with multimedia projects and participating in my study. We are truly a family!

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ABSTRACT

The purpose of this action research was to identify and describe teachers' needs and preferences and administrator perceptions of teachers' needs and preferences for educational technology-focused professional development at a public southeastern high school in a suburban school district in order to make recommendations for future professional development. In our fast-paced, ever-changing digital landscape, professional development should emphasize the effective use of educational technology while also catering to goals and ability levels of educators. Teachers are tasked with instilling digital literacy skills with their students but need quality professional development to do so. This study focused on two research questions. This first question sought to determine teachers' needs and preferences for educational technology-focused professional development at Lakeside High School. The second question explored administrators' perceptions of teacher needs and preferences as it pertains to educational technology-focused professional development at Lakeside High School.

This study incorporated a mixed-methods approach in order to triangulate data. Participants in this study were teachers and administrators from Lakeside High School in a suburban school district. Quantitative data were collected from teacher surveys concerning educational technology-focused professional development. Qualitative data were collected from three teacher-focus groups and two administrator-focus groups. Quantitative data indicates that teacher-participants are neutral about their experiences

with educational technology-focused professional development, hesitant to incorporate new technology tools, and do not integrate 21st century skills very often in their classrooms. Qualitative data revealed that educational technology-focused professional development does not meet the needs and preferences of teacher-participants. Teachers should have time for content-focused collaboration and practice time, sessions that are differentiated, and tools modeled for them. Future professional development should incorporate the essential conditions set forth by the International Society for Technology in Education (2020). Implications for future research would be to evaluate the integration of ISTE's (2020) essential conditions for future professional development.

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CHAPTER 1
INTRODUCTION
National Context

As Nancy Kassebaum says, “There can be infinite uses of the computer and of new age technology, but if teachers themselves are not able to bring it into the classroom and make it work, then it fails” (Gupta, 2015, para. 2).

Data collected from a fast response survey system and compiled by the National Center for Education Statistics indicate that there is a gap between teachers who feel as though they are sufficiently trained to integrate technology in the classroom. Only 61% of teachers feel sufficiently trained through professional development activities and technology support staff, compared to 93% of teachers who agree they are interested in using technology to enhance their classroom instruction (Gray, Thomas, & Lewis, 2010). Perhaps the issue of the utilization of technology in many classrooms does not stem from a lack of interest, but from a lack of proficiency in using technology. Professional development should emphasize the use of instructional technology while also catering to goals and ability levels of educators. “Worldwide, there is a dire need for high-quality professional learning opportunities for teachers” (Carpenter & Linton, 2016, p. 106). Teachers are often encouraged to differentiate instruction based on their diverse student population, but professional development is not differentiated to meet the needs of our diverse educators. In the same fast response survey mentioned previously, when asked

how students use technology in the classroom teachers in public schools indicated that activities utilizing educational technology resources were not used very often. For example, the following are statistics from teachers who reported how their students used educational technology sometimes or often in their classroom: 42% developed multimedia presentations, 25% created art, music, movies or webcasts, 17% developed or ran demonstrations, models, or simulations, and only 13% designed and produced a product (Gray et al., 2010). These data are from 2009 and compiled in a 2010 report. However, a 2014 report from the National Assessment of Educational Progress (NAEP) concluded that only 43% of eighth graders were at or above proficient for technology and engineering literacy. As stated in the 2014 NAEP Technology and Engineering Literacy (TEL) Framework, the definition of technology and engineering literacy is “the capacity to use, understand, and evaluate technology as well as to understand technological principles and strategies needed to develop solutions to achieve goals” (Sharp, 2014).

“Teachers’ duties are changing to embrace a role of curating and facilitating learning experiences and encouraging student exploration to discover passions” (Adams-Becker, Freeman, Giesinger-Hall, Cummings, & Yuhnke, 2016, p. 24). There should be an emphasis on assisting teachers to become facilitators of learning rather than lecturers for an audience of students. Without proper professional development that emphasizes the effective use of instructional technology in the classroom, teachers may not embrace their new role to allow students the opportunity to meet the NAEP TEL framework definition. Similarly, a focus in education is teaching students 21st century skills. The National Education Association (n.d.) identifies four components of 21st century skills, which include critical thinking and problem solving, communication, collaboration, and

creativity and innovation. These four skills and the NAEP TEL framework may not be addressed in classrooms due to lack of effective educational technology-focused professional development.

In her 2012 dissertation research, Knight observed four reasons why teachers do not incorporate technology into their classrooms very often. These reasons include lack of teacher understanding of technology, need for more assistance with technology, curriculum roadblocks, and negative teacher perceptions of advantages to utilizing technology in the classroom. Note that the top two reasons revolve around teacher training and development. However, even with proper training and development teachers will want to learn about educational technology integration if they realize that student learning is positively impacted (Ertmer & Ottenbreit-Leftwich, 2010).

As the data indicates, teachers do not feel completely confident with using instructional technology tools in an effective way. This is evident with the low percentage of teachers that feel as though professional development and technology support staff have prepared them for utilizing instructional technology effectively (Gray et al., 2010). “The challenge is exacerbated by the rapidly evolving digital landscape in which educators are increasingly expected to be technologically savvy in order to instill digital literacy skills with their students” (Adams-Becker et al, 2016, p. 20). This information, along with the data concerning how instructional technology is used in the classroom in the fast response survey system from the National Center for Education Statistics, potentially indicate that there may be a disconnect between educational technology-focused professional development and the actual implementation of effective teacher technology integration in the classroom.

Local Context

Central School District (pseudonym) identified five technology dimensions in their current technology plan to meet the district's current technology needs (Central School District, 2015). The current technology needs include increasing student access to technology, increasing instruction equipment, and expanding integration technology staff. The five technology dimension goals include: 1) provide the means for students to become effective 21st century digital users and producers, 2) provide effective curriculum and educational technology-focused professional development, 3) promote digital learning environments for all stakeholders, 4) maximize community involvement with technology, and 5) provide and reliable and safe network for stakeholders.

There is no public data concerning the overall professional development for the district; however, teachers have admitted that they want to implement more technology in their classroom, but they do not have time to revamp their lessons after professional development. As a teacher and former Technology Teacher Leader (TTL), I hear the issue of wasted time in school- and district-based meetings from my colleagues. This, along with all of the other tasks teachers have to accomplish on a day to day basis, makes it difficult to plan curriculum-based lessons that implement technology. My colleagues and I often do not have the opportunity to explore and collaborate with each other to determine how various instructional technology tools can be used in our classrooms due to the numerous other 'duties as assigned' and content-focused meetings in the teaching profession.

Lakeside High School's Digital Integration Specialist (DIS) surveyed teachers concerning the use of iPads and a cloud-based assessment system purchased by the

district (DIS, 2014). This survey determined that teachers are discontented with instructional technology provided by the school district. Requests for technology professional development were obtained with 70% of respondents indicating that they would like more training, time and/or collaboration on the implementation of technology in their classrooms. For example, one respondent replied to the question regarding the need professional development, “Yes, this is my first year in the district and I would like more training on how to use the iPad in the classroom effectively,” while another respondent indicated, “I would love to see examples of lessons that teachers use in their classroom that integrate technology” (DIS, 2014).

Although I use many different types of technology in my classroom and have served as a TTL, there are teachers in my school and district that find it challenging to simply open an attachment sent to them via email. These teachers attend professional development sessions that review new types of instructional technology. However, for technologically-novice educators, it may be the technology that intimidates them and/or they have other tasks at school that prohibit them from completely immersing themselves in research on the use of educational technology presented in professional development sessions. If professional development catered to the multiple ability levels of teachers, from the technologically-novice educators to the experts, professional development regarding integrating technology would not seem like such a waste of time for all educators. Likewise, if teachers were provided time during professional development sessions to collaborate with their colleagues, perhaps they could develop their curriculum that also enhances student proficiency as stated in the NAEP TEL framework definition.

The school is a part of a suburban district in the southeastern United States. The district, as a whole, is a one-to-one (1:1) device district. Prior to the 2012-2013 school year, high school teachers received iPads to begin learning how to use them. During the 2013-2014 school year, the students received iPad minis to use for schoolwork. The following year the middle school students in the district received a Chromebook. From that point forward, middle school students who had previously used a Chromebook had to learn how to use an iPad during their freshman year of high school. Beginning in the 2017-2018 school year, all high school faculty transitioned from iPads to Chromebooks. This increased consistency for students transitioning from middle school to high school but served as a new challenge to high school teachers. At the start of the 1:1 technology initiative, many school- and district-based professional development opportunities at the high schools were provided to help teachers with integrating iPads into their instructional units. However, as the district has moved to Chromebooks instead of iPads, district- and school-based professional development has moved to a Google Apps for Education (GAFE) focus.

For high school teachers that have struggled to get used to the iPads, this may serve yet another curve ball for which they will have to adjust once again. Changing the main electronic device used by current high school students may initially cause a bit of discomfort for the teachers and the students if professional development sessions are not conducted effectively.

Not only can there be an issue with new technology tools at the high school level, but there can be an issue with the fact that not all students elect to use a district-issued Chromebook. They may opt to bring their own device. Many students opt to use their

cell phones or other personal electronic devices as their source of technology to use in the classroom.

Statement of the Problem

Professional development regarding instructional technology does not meet the needs of educators. This evidence has been cited in multiple research studies (Boriack, 2013; Campbell, Longhurst, Wang, Hsu, & Coster, 2015). Many educators use technology for administrative purposes, rather than to increase student gains as stated in the NAEP TEL framework or 21st century skills (Chandy, 2013). Professional development sessions should focus on the needs and preferences of teachers, rather than the needs of the presenters.

Purpose Statement

The purpose of this action research was to identify and describe teachers' needs and preferences and administrators' perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School (a pseudonym) in Central School District (a pseudonym) in order to make recommendations for future professional development. Pseudonyms are used throughout this research manuscript to protect the identity of participants.

Research Questions

1. What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?
2. What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?

Research Subjectivities and Positionality

As a biology teacher, I have always taught the scientific method as a means to explore the world and answer questions pertinent to topics in class. Developing a question and hypothesis based on previous knowledge and experience is foundational to planning the methodical procedures for an experiment. However, through my experiences and work in a more socially oriented field, teaching, a rigid postpositivist paradigm does not always fit the questions I generate as an educator.

Teaching has evolved even since I began my career over 16 years ago. The teaching practices that helped students learn concepts have changed and are now more technology focused. “What we know is tentative or fallible for it has been created in particular circumstances to meet particular ends and to express particular values (Hammond, 2013, p. 607).” Currently, I have my students create visually aesthetic, auditorily pleasing informational videos when submitting a research project. Previously, my former students completed a PowerPoint presentation and read the screen, and before that my students completed a written and oral report. This illustrates the fact that technologies become more advanced as time passes. This is true in education, and all aspects of life.

Just as technology has changed how I assign projects in my classroom, so do the people that are in the classroom. Research methods will need to vary depending on the time, location, and subjects. Also, problems that arise in my community may or may not be the same as problems in other communities. Therefore, my paradigm aligns more with the pragmatic paradigm.

My research interest reflects the ever-evolving classroom. How can I encourage my school and district leaders to enable fellow educators to adjust their current teaching methods to reflect a society that is changing? Although my research may be outdated in the years to come, it will hopefully encourage my school and district to create professional development opportunities that allow fellow educators to step out of their comfort zone by implementing technology effectively in their classrooms.

Ontology, or the nature of reality, in a pragmatic view can vary depending on the lens of the individual. “To establish truth pragmatically is to settle a controversial or complex issue for the time being, until something comes along to dislodge the comfort and reassurance that has thereby been achieved, forcing inquiry to begin again” (Cochran, 2002, p. 527). My research in professional development with educational technology as a focus must take this into account. Some educators do not use technology in the classroom. Although the reality is that technology is available to all of the educators in my school and district, some are not using technology beyond PowerPoint presentations. The needs and preferences of teachers greatly impact their willingness to participate and implement technology in their classroom (Ertmer & Ottenbreit-Leftwich, 2010). Therefore, the data collected regarding teachers’ needs and preferences for educational technology-focused professional development should be the basis for making my recommendations for future professional development. The reality that these recommendations will not always be pertinent to particular situations in the future must be taken into account when I consider my methodology for research.

In my research, not all of my subjects will use technology in the same way. For example, some teachers may use Twitter to make announcements for the class, while

another uses the Remind app to alert students, and still others may not use technology for communications at all. Epistemology is the study of the nature of knowledge. These considerations must be made when I write the questions in my surveys and focus group interviews. “Experience, as we know, has ways of BOILING OVER, and making us correct our present formulas” (James, 2010, p. 153). Do teachers avoid using social media or communication apps because of their experiences with students? Do teachers find a level of comfort with teaching as they have always taught in the past? Perhaps exposure to professional development that shows the positive impacts of various types of social media and other educational technology tools will encourage teachers to utilize a variety of instructional technology. My research will make recommendations based on teachers’ needs and preferences.

The approach to inquiry or methodology, for a pragmatist often elicits both qualitative and quantitative data collection methods. “...an increasing awareness, and valuing, of the 'mixed-methods' approach to research is now present in the fields of social, educational and health research” (Glogowska, 2011, p. 251). As Christ (2013) describes in his Worldview Table, “various forms of qualitative and quantitative data are blended to create a representative model” (p. 112). For my research, I plan to assess how teachers currently use technology in their classroom, teachers’ self-reported needs and preferences for educational technology-focused professional development, and administrators’ perceptions of teachers’ needs and preferences of educational technology-focused professional development. The use of surveys (i.e. Likert Scales) and focus group interviews can collect meaningful quantitative and qualitative data. The data can

then be used to make recommendations regarding future educational technology-focused professional development.

Ethics are important for all investigative studies. Regardless of the outcome, it is through the lens of the researcher that the data are analyzed and explained. The values of the researcher can influence the processes of the researcher (Christ, 2013).

“Nevertheless, from a pragmatic perspective the question remains as to whether knowledge is a sufficient and appropriate condition for virtue, if, in other words, the originality of the ethical is explicable as a form of propositional knowledge” (Hetzel, 2015, p. 132). Depending on my values and the values of my subjects in my study, the methods, data collection, and data analysis will reflect our values as a whole!

Definition of Terms

1. Educational Technology - “Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2008, p.1).
2. Effective use of technology - Effective use of technology is defined as any technology that is used in the classroom that increases students understanding of concepts and curricular content.
3. Professional Development - Professional development is effective when it focuses on student learning, provides opportunities for teachers to increase subject matter and pedagogical knowledge, allows for reflection, utilizes research-based best practices that teachers can use in their classroom, encourages collaboration with experts and colleagues, enables teachers to serve as leaders, and is frequently

- analyzed in order to improve practice (Louks-Horsley, Stiles, Mundry, Love, & Hewson, 2010).
4. Teacher collaboration - "...collaborative practices have been defined as central to professional development because they further opportunities for teachers to establish networks of relationships through which they may reflectively share their practice, revisit beliefs on teaching and learning, and co-construct knowledge" (Musanti & Pence, 2010, p. 74).
 5. Teacher's needs - Teacher needs are defined as practices that teachers want to focus on in order to learn how to effectively utilize technology in their classrooms. These needs should be taken into consideration when developing educational technology-focused professional development. Teachers' needs will be identified and describe with a survey and focus group interview.
 6. Teachers' preferences – Teachers' preferences are defined as the methods of learning preferred by teachers for professional development in educational technology. These preferences should be taken into consideration when developing educational technology-focused professional development. Teachers' preferences will be identified and described with a survey and focus group interview.
 7. Needs assessment – Needs assessments allow professionals the ability to use data-drive recommendations in order to solve current challenges and to identify gaps in performance (Morrison, Ross, Kalman, & Kemp, 2013; Rossett, 1995).

CHAPTER 2

LITERATURE REVIEW

The purpose of this action research was to identify and describe teachers' needs and administrator perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School in Central School District in order to make recommendations for future professional development. The review of related literature builds a foundation to answer two research questions: (1) What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School? and (2) What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?

The literature review is organized into two sections. The first section is a comprehensive analysis of what we know about educational technology-focused professional development. The second section evaluates alternatives to the current methods of professional development. My literature review examines these areas in order to describe how professional development is perceived by teachers and administrators.

In an effort to understand the problem of educational technology-focused professional development, I evaluated previous literature. The purpose of this action research was to evaluate and describe teachers' needs and administrators' perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School in Central School District in order to make recommendations for future

professional development. Teacher effectiveness has the potential to increase in supportive schools (Kraft & Papay, 2014). Therefore, schools should champion the means to improve the perception of the value of technology and support teacher utilization of technology through meaningful and effective professional development (Ertmer & Ottenbreit-Leftwich, 2010).

Based on the research questions, I used multiple keyword combinations to locate literature: teacher beliefs, teacher professional development (PD and TPD), educational technology, teacher preparation, information and communication technology (ICT), adult learning, teacher motivation, technology integration, student perceptions, coaching, EdCamp, workshops, espoused theory, diffusion of innovation, secondary education, technology implementation, in-service teacher, and barriers. I refined my search to include references that were full text and peer reviewed. I also limited the timeframe for the references within the last five years. The references for this literature review were collected through electronic databases at the University of South Carolina library, *EBSCO*, *ProQuest Dissertations and Theses Global*, *Google Scholar*, and *JSTOR*. Although many keyword combinations did not result in successful references, reference mining from relevant articles and student colleagues were very helpful in locating high-quality references.

Educational Technology-focused Professional Development

In order to ascertain the current status of educational technology-focused professional development, I will address three topics. These include (1) what we know about educational technology-focused professional development, (2) methods to address

educational technology-focused professional development, and (3) methods used to investigate educational technology-focused professional development.

What is Known about Educational Technology-focused Professional Development

This section will review three components of educational technology-focused professional development. The first section will define professional development. Then it will analyze related theories and frameworks. Lastly, it will address gaps in the literature concerning educational technology-focused professional development.

Defining educational technology-focused professional development. The Organisation for Economic Co-operation and Development (OECD) Teaching and Learning International Survey (TALIS) (2009) defines professional development as any activity that may enhance the “skills, knowledge, expertise, and other characteristics” of educators for their teaching practices. Educational technology-focused professional development should allow teachers to enhance their effective use of technology in their content area with the use of sound pedagogy (Koehler & Mishra, 2009). Ertmer and Ottenbreit-Leftwich (2010) assert that when educators realize student learning can be positively impacted by the use of technology, they will want to learn about integrating technology in their teaching practices.

Related theories and frameworks. There are four theories and frameworks that are related to educators and educational technology-focused professional development. These theories and frameworks are described and evaluated: (1) adult learning theory, (2 and 3) espoused theory vs. theory-in-use, (4) diffusion of innovation, and (5) technical knowledge, pedagogical knowledge, and content knowledge (TPACK).

Adult learning theory. Adults tend to learn when they need to know information and are ready to learn, are motivated by external factors, or find a use for what they are to learn because they are self-directed and have many life experiences (Cox, 2015; Knowles, 1978). Specifically, Knowles (1973) coined the term andragogy to describe how adult learners are different from younger learners. There are four assumptions of andragogy. First, adults have a change in self-concept and therefore do not want to be treated as children, even in the way they learn. They are more self-directed and take ownership of their learning. Second, adults have more life experience than younger learners. Therefore, utilizing the experiences of educators is important to their learning process as adults. Third, adults are ready to learn because there is a social role to fill and they have a need to learn. Lastly, adults are oriented to learn in order to fill an inadequacy they are facing (Knowles, 1978). Adults tend to learn better when the material is meaningful to them.

Espoused theory vs theory-in-use. Argyris and Schön (1996) identify the espoused theory as a means to describe how individuals explain their activity. This explanation is not always what is observed as described as the theory-in-use (Argyris & Schön, 1996). Teachers may say that they teach problem-solving skills and critical thinking but, they do not explicitly teach these skills (Jones, 2009). There is a disconnect between what people say they do or believe in and what they actually do (Ertmer & Ottenbreit-Leftwich, 2010; Paese, 2017). There is limited literature on the use of technology in the classroom as it applies to the espoused theory and theory-in-use. However, as with many self-reporting studies, the perception of the use or

knowledge of technological tools in the classroom may differ from actual use in the classroom (Lehist, 2015).

Diffusion of innovation. Rogers (2001) describes the diffusion of innovation as a means for adoption of new innovations. Innovations vary in their penetration in a society. Members of a society must identify the innovation to provide an advantage over current methods. Innovations must also be consistent with the values and needs of individuals contemplating the use of the innovation. If an innovation is viewed to be too complex, potential users may shy away from utilizing the innovation. Potential users also want to be able to slowly learn by doing before fully implementing a new innovation. It is also important for potential users to directly observe positive outcomes as a result of a new innovation. These aspects of an innovation are just a small part of whether or not it will be implemented.

Rogers (2001) asserts that communication of the innovation is critical for implementation of the innovation. Also, time serves as a key component to determine if an innovation will be adopted or not. Individuals are categorized based on their willingness to adopt an innovation. The small percentage of individuals who are considered innovators will readily adopt an innovation regardless of cost or uncertainty. Early adopters are respected change agents and serve as role models in their community by increasing the use of an innovation. Individuals who adopt an innovation before average members are considered the early majority. They do not serve the community in a leadership capacity, rather they are connected with peers and contemplate for a longer period of time before adopting an innovation. Late majority individuals may be prodded to utilize an innovation once they are pressured by peers. Lastly, laggards are very

suspicious of innovations and will avoid using the innovation until it is continuously successful in the community (Rogers, 2001). The diffusion of innovation speaks loudly in education. Teachers can be categorized in these five categories based on their use of educational technology.

TPACK (Technological Pedagogical Content Knowledge). Educators may have difficulty integrating technology with their content and pedagogical beliefs. TPACK, as seen in Figure 2.1, is the framework that organizes and shows overlap between content knowledge, pedagogical knowledge, and technical knowledge (Koehler & Mishra, 2009). Unlike traditional materials, technology has multiple uses, is rapidly changing, and the inner workings of technological tools are not known to most educators (Koehler & Mishra, 2009). Also, educators must navigate through many different technological tools that have the potential to help them in the classroom. While one app may assist students with recording a video, it may not be easy for editing a final video project. Technologies used for education have great potential, but they also have constraints that make it difficult for teachers to choose which technologies will best suit their needs (Koehler & Mishra, 2009). Current classroom teachers have a lower self-confidence while using technology (Lehiste, 2015). Davies and West (2014) argue that while we have seen an increase in the availability of educational technology, there is a lack of evidence that implementation is occurring. With professional development focused on assisting teachers with technological, pedagogical, and content knowledge, they can evaluate how to incorporate technology into their lesson plans within the context of appropriate content and pedagogy.

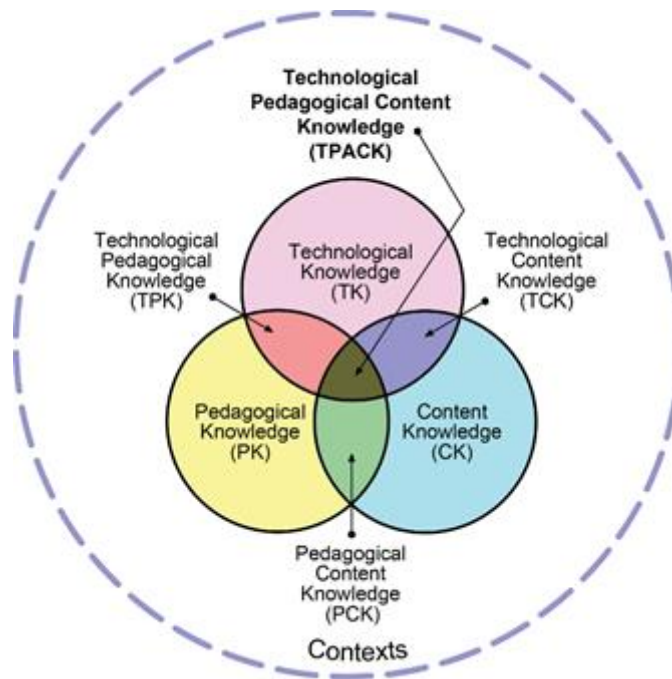


Figure 2.1. TPACK Framework. This figure illustrates the overlap between technical, pedagogical, and content knowledge, also known as the TPACK framework. This image has been reproduced with permission of the publisher, © 2012 by tpack.org.

Gaps in the literature. There are multiple gaps in the literature concerning educational technology-focused professional development. One such deficiency relates to the use of informal teacher professional development (Trust, 2016; Trust, Krutka, & Carpenter, 2016) to supplement formal teacher professional development. Teachers will want to learn how to use technology if they find that students will benefit (Ertmer & Ottenbreit-Leftwich, 2010). However, the development of strategies to enhance the perception of the value of technology for teachers (Ertmer & Ottenbreit-Leftwich, 2010; Kale, 2018) and students (Thomas & Muñoz, 2016) have not been the focus of many studies. Even if teachers attend educational technology-focused professional

development, there is limited data collected that demonstrates actual utilization of tools learned through educational technology-focused professional development (Ertmer & Ottenbreit-Leftwich, 2010).

Methods to Address Educational Technology-focused Professional Development

This section will review two aspects of current methods used to address educational technology-focused professional development. These aspects include: (1) existing strategies and (2) dissatisfaction with existing strategies.

Existing Strategies. There are multiple strategies used to address professional development needs of educators. This literature review will describe the advantages and disadvantages of five different methods. These include: (1) school or district-based professional development, (2) EdCamp, (3) professional learning communities (PLCs), (4) massive open online courses (MOOCs), and (5) coaching.

School- or district-based professional development. Many schools and districts allot time for teachers to have professional development at the beginning of the school year before students arrive and other in-service dates are dispersed throughout the school year. These types of professional development methods are already in place for schools and school districts. One disadvantage to this strategy includes a lack of ongoing support (Guskey & Yoon, 2009; Latif, 2017). Along with lack of support, many professional development models follow the “sit and get” method that includes too much information crammed into a single session without proper follow-up (Guskey & Yoon, 2009). The professional development that is dispersed throughout the year often feels disconnected (Garet, Porter, Desimone, Birman, & Yoon, 2001) and unrelated to the current needs of

the teachers. Teachers need useful professional development to help them integrate technology into their everyday lesson planning.

EdCamp. EdCamp is an informal method of professional development that had its first official kick-off in 2010. These events are typically free and organized by educators. Participants are responsible for building sessions into the EdCamp schedule and participants can leave any session they do not find to be relevant (Swanson, 2014). EdCamp has many advantages that include a positive atmosphere, connectedness with technology, rich conversation, discussion and collaboration with peers, collection of new ideas for instruction, organization, networking, and participant-driven engagement and choice (Carpenter, 2016; Carpenter & Linton, 2016). There is an EdCamp wikispace and the #edcamp hashtag is included in thousands of tweets. This is how many educators are sharing what they have learned about and resources discussed in EdCamp sessions. While there are many advantages to EdCamps, disadvantages have been noted for this newer concept of professional development as well. Some participants do not fully participate or collaborate during sessions, some sessions seem to be too short for the amount of resources discussed, there is variation in structure of sessions, participant-led sessions make materials unavailable, not all topics desired by participants are addressed, there are fewer contact hours, and there is no increase in content knowledge (Carpenter, 2016; Carpenter & Linton, 2016). EdCamp may serve as an informal method of teacher-directed professional development that has potential to increase effective educational technology use in classrooms.

Professional learning communities (PLCs). A type of school-based professional development that has been in many school districts is the professional learning

community (PLC) model. This type of professional development consists of teachers who teach the same or similar curricular content. These PLCs are supposed to assist teachers to develop mastery in their teaching skills or assessing student work (Stanley, 2011). There are multiple advantages to following the PLC model of professional development. Professional learning communities provide an opportunity for developing effective communication, the ability to brainstorm and discuss ideas concerning technology within content areas, and on-going peer support (Jones & Dexter, 2014). Because PLCs are a school- or district-supported endeavor, the amount of paperwork involved can be a disadvantage (Jones & Dexter, 2014). Teachers, along with leadership, should be committed to PLCs in order for them to be successful (Peppers, 2015). As with most types of professional development, the educators play a key role in the overall effectiveness of this professional development model.

Massive open online courses (MOOCs). Massive open online courses are a type of professional development that is self-selected by individuals, rather than an entire school or district. They do not require a traditional delivery of material. Learning can occur at any time or any place that is convenient for the learner (Tossell, Kortum, Shepard, Rahmati, & Zhong, 2015). Massive open online courses have opened the door to provide high-quality education in a cost-effective and efficient manner (Misra, 2018). They are flexible, enhance skills, and have the potential to meet the needs of many individuals (Misra, 2018). However, teachers are not knowledgeable about MOOCs or may be reluctant to enroll in MOOCs as a means of professional development (Misra, 2018). Also, MOOCs have an issue regarding dropout rates, student supports, and quality assurance (Zawacki-Richter, Bozkurt, Alturki, & Aldraiweesh, 2018). It has been

suggested that the popularity of MOOCs was great at first, but has now dwindled (Tossell et al., 2015).

Coaching. Coaching is a professional development model that utilizes a coach or mentor to support teacher growth. Coaching, along with community and social learning, is an integral part of educational technology-focused professional development (Desimone & Pak, 2017; ISTE, 2020). Also called situated professional development, coaching is beneficial because it meets teachers' needs where they are in both curriculum and environment (Ertmer & Ottenbreit-Leftwich, 2010). There are times when instructional coaches are tasked with other duties outside of coaching. This can cause the instructional coach to spend less time on coaching their fellow colleagues and more time on the "other duties as assigned" (Heineke & Polnick, 2013). Full implementation of a coaching model is key to success (Heineke & Polnick, 2013). When educators are given the opportunity to be coached and observe colleagues successfully implement technology, their self-efficacy may increase, which may increase the likelihood of utilizing instructional technology.

Dissatisfaction with existing strategies. There are disadvantages of not addressing current educational technology-focused professional development models. Teachers may attend professional development, but unless they fully participate, they may not implement the strategies in their classroom. Also, current professional development for teachers will not increase 21st century skills in students (Ananiadou & Claro, 2009; Bond, 2015). If teachers do not incorporate 21st century skills in their instructional practices, students may be unprepared for the challenges of the future, and instructional strategies used in the classroom will become stagnant (Tondeur, Forkosh-

Baruch, Prestridge, Albion, & Edirisinghe, 2016). If teachers are unable or unwilling to follow through with educational technology-focused professional development, students have little reason to stay focused in class. In a survey by Thomas and Muñoz (2016), students indicated they often felt distracted by mobile phones in the classroom. Similarly, Gokcearslan (2017) noted that students find tablets are a source of distraction in class. Cyberslacking, or using technology in ways that are not focused on learning, is a problem in classrooms. Taneja, Fiore, and Fischer (2015) suggest that teachers should attempt to decrease students' course apathy and increase attention by developing lessons that pique student interest and making learning more enjoyable. Teachers may find that cyberslacking will decrease if they learn how to effectively implement 21st century skills and technology.

There are multiple advantages of addressing educational technology-focused professional development. Just as some students see technology in the classroom to be distracting, many students find that technology integration enhances classroom instruction (Thomas & Muñoz, 2016). When teachers are treated as professionals and supported by their administration, they improve in their effectiveness in the classroom (Kraft & Papay, 2014). As a result of effective professional development and implementation, students' learning may increase because teachers can incorporate authentic learning experiences with technology (Bond, 2015). A part of increasing student learning may result from an increase in the intertwining 21st century skills in the classroom. Collaboration among peers and students can enhance teaching and learning (Beeson, 2013; Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2016). When educational technology-focused professional development is effective, teachers are more

likely to implement it in the classroom. This may lead to an increase in the 21st century skills that are expected from our students.

Methods used to Investigate Educational Technology-focused Professional Development

Educational technology-focused professional development is not a new field. There have been many studies on this topic. This section will review a few of the different methodologies used to study this field. This analysis of methodologies includes: (1) qualitative studies, (2) quantitative studies, and (3) mixed-methods studies.

Qualitative studies. Qualitative studies provide researchers with in-depth descriptions of multiple realities of different individuals (Mertler, 2017). Chandy (2013) assisted in conducting a three-week summer course geared toward the use of nanotechnology. This case study research included observations and interviews after the teachers participated in the summer course. Mouza and Barrett-Greenly (2015) also conducted a case study with observations and interviews, as well as student focus groups. In both cases, the researchers found a change in pedagogical beliefs, an increased competence in the use of technology, and student interest affect the use of educational technology in the classroom (Chandy, 2013; Mouza & Barrett-Greenly, 2015).

Sheffield, Blackley, and Moro (2018) opted to use pre- and post-surveys along with sticky notes during their initial workshop. The researchers also conducted structured interviews midway through the study. Yet another case study from Ekanayake and Wishart (2015) utilized a three-day workshop to plan for mobile phone integration, followed by implementation of the lesson, and a review workshop. These studies suggest that providing time for teachers to learn-by-doing (Ekanayake & Wishart, 2015; Sheffield

et al., 2018), plan lessons with technology integration, followed by a review time after lessons have been implemented have shown to have positive effects on teacher attitudes toward technology implementation in the classroom (Ekanayake & Wishart, 2015). Observations, interviews, and focus groups, all types of qualitative designs, can provide rich and in-depth data.

Quantitative studies. Many quantitative studies utilize surveys in order to collect numerical data. Tackett (2014) surveyed teachers concerning their perceptions of effective professional development focused on one-to-one technology implementation. While teachers indicate professional development is important to implement technology in the classroom, the age and level of experience of a teacher may affect the type of professional development preferred (Tackett, 2014). It appears that older teachers preferred long-term professional development, while younger teachers preferred short workshops. Tweed (2013) analyzed demographic factors and time spent in professional development as they related to technology integration by giving a survey to participants. Teacher perceptions and self-efficacy concerning their capability to effectively utilize educational technology in the classroom has an impact on actual implementation (Ertmer & Ottenbreit-Leftwich, 2010; Tweed, 2013) regardless of demographic factors and amount of professional development (Tweed, 2013).

White (2014) also used a survey to determine if school-based or outside professional development increased their use of technology in the classroom, discover the need for more training in particular areas, and identify teacher barriers to technology integration. Sheffield et al. (2018) also conducted surveys. However, their surveys occurred before and after professional development implementation (Sheffield et al.,

2018). Through the surveys from both studies, it was determined that hands-on training allows teachers to feel more comfortable utilizing educational technology in the classroom (White, 2014; Sheffield et al., 2018). Surveys can provide quantitative data for analysis, but many times are dependent upon self-reporting scores.

Mixed-methods studies. Mixed-methods studies combine rich qualitative data with numerical quantitative data. DeSantis (2012) utilized three instruments for data collection, a self-efficacy survey, semi-structured interviews, and a survey to determine experiences in professional development sessions. Based on the triangulated data, it was suggested that long-term professional development plan that utilizes collaboration and meets the needs of educators at various levels results in a greater self-efficacy of technology usage (DeSantis, 2012), which is also claimed to be effective by Ertmer and Ottenbreit-Leftwich (2010).

Bond (2015) collected qualitative data from teacher reflections and quantitative data from a Technology Integration Matrix. Based on the results from the data, it was determined that teacher professional development should be focused on how to engage students with technology in the classroom rather than focused on teacher operation training (Bond, 2015). Using a mixed-methods approach to data collection allows for rich, descriptive data and provides opportunities for triangulation of data (Mertler, 2017).

Alternatives to Current Educational Technology-focused Professional Development

In order to evaluate the alternatives to the current educational technology-focused professional development, I will address two topics. These two topics include: (1) the need for better solutions and (2) addressing the issue of educational technology-focused professional development.

Need for Better Solutions

There is a need for better solutions to help teachers implement effective technology in the classroom. There are two aspects concerning the need for better solutions. The two aspects include: (1) barriers to implementation and (2) reasons for addressing educational technology-focused professional development.

Barriers to implementation. There are three main barriers to the implementation of educational technology in today's classrooms. These are: (1) lack of resources, (2) time constraints, and (3) teacher-perceived lack of experience.

Lack of resources. School districts may lack the resources and infrastructure necessary to implement a quality educational technology-focused professional development model (Ertmer & Ottenbreit-Leftwich, 2010), although they can partner with local colleges and universities to conduct such training. This can allow colleges and universities with master's programs to provide services for educators without cost (Winslow, Dickerson, Weaver, & Josey, 2016). Teachers may also feel frustrated when using technology due to the lack of community support, technical support (Hew & Brush, 2007), and support from peers and administrators in their school (Inan & Lowther, 2010). Using the expertise of surrounding colleges and universities may provide high-quality professional development for the teaching staff and will provide the opportunity for college students to gain first-hand experience.

Time constraints. Time refers not only to the scheduling issues of professional development (i.e. duration and when it occurs), it also encompasses the time educators must devote to learning outside of school hours. Hew and Brush (2007) infer that some teachers work many hours outside of school in order to ensure proper implementation of

technology. However, they also claim that many teachers suffer from burnout as a result of the extra hours (Hew & Brush, 2007). Aside from the constraints of personal time, scheduling of professional development sessions may not coincide with the needs of the educators (Jones, 2009). For example, teachers may feel a rush to get their classrooms prepared at the beginning of the year with mandatory meetings, classroom organization, administrative tasks; thus, they may not feel focused on technology plans. Hechter and Vermette (2013) identify planning for technology integration, researching appropriate tools, teaching curricular content, and teaching students how to use specific technology tools as barriers to implementation. Also, districts, schools, or educators themselves may not be able to devote the amount of time necessary to fully implement a quality educational technology-focused professional development model.

Teacher-perceived lack of experience. The availability of instructional technology has increased over the years. However, it is reported that teachers still use technology for administrative tasks, communication, and substitution of non-technology tools rather than transformative activities (Project Tomorrow, 2017). While 43% of teachers view effective technology implementation as extremely important, 60% of principals and 71% of district administrators view technology implementation as extremely important (Project Tomorrow, 2017). There is a disconnect between administrators' views and teachers' views on the importance of technology implementation. This disconnect may result in professional development that does not fully address the needs of the schools and students, nor will it address the needs of the teachers. It has been suggested that the professional development for technology integration has been lacking, which leaves teachers feeling inadequate to use technology

(Koehler & Mishra, 2009). Many teachers have a perceived lack of experience with technology; thus, they may not see the value in technology utilization (Hew & Brush, 2007; Inan & Lowther, 2010; Koehler & Mishra, 2009). When there is an availability of technology, technical support, and overall support, teachers are more likely to value and be prepared for technology integration in the classroom.

Reasons for addressing educational technology-focused professional development. If students are performing well on standardized tests without the effective use of educational technology, teachers may feel as though there is no need to implement technology (Tondeur, van Braak, Ertmer, & Ottenbreit-Leftwich, 2017). Therefore, teachers are not motivated to increase their implementation of technology in the classroom (McGee, 2015; Tondeur et al., 2017; White, 2014). Perceived lack of return on investment from an educator's perspective (Kale, 2018) can be caused due to the amount of time involved in preparation versus the outcome of student learning (Tondeur et al., 2017). Teachers often find the inability to evaluate the efficacy of new technology in a specific content area and flawed design of intervention to use new technologies in the classroom (Ertmer & Ottenbreit-Leftwich, 2010; McGee, 2015) keep them from utilizing technology with students.

Cost-effectiveness of professional development can also be an inherent challenge (White, 2014; Winslow et al., 2016; Woo, 2016). Schools and districts can also utilize teachers and students, at little or no cost, to serve as technology champions (Woo, 2016). Educational technology is ever-changing. Some educators and professional development facilitators cannot keep up with such a fast-paced change (McGee, 2015). Therefore, it is up to schools and districts to implement an effective educational technology-focused

professional development model to assist teachers with technology integration in the classroom.

Addressing the Issue of Educational Technology-focused Professional Development

The following two points provide a picture of what educational technology-focused professional development should look like. These two points include: (1) defining better solutions, (2) conducting a needs assessment, and (3) students' need for 21st century skills.

Defining better solutions. There are multiple factors to be considered when designing educational technology-focused professional development. First, professional development should be on-going rather than short, random sessions (Garet et al., 2001; Hew & Brush, 2007). This allows time for teachers to have continuous assistance and feedback when utilizing technology with students. Second, teachers should have hands-on experience and appropriate training based on their technology proficiency (Basagekar & Singhavi, 2017; Ekanayake & Wishart, 2015; Garet et al., 2001; Hew & Brush, 2007). Allowing for hands-on training that aligns with their technology proficiency may increase the self-efficacy of teachers which has been found to increase technology integration (Ertmer & Ottenbreit-Leftwich, 2010). Third, teachers should utilize technology to enhance 21st century skills of their students (Beriswill, Bracey, Sherman-Morris, Huang, & Lee, 2016) through collaboration with their colleagues (Garet et al., 2001; Sheffield et al., 2018) rather than using technology for dissemination of information. Teachers need sufficient training to adopt methods to enhance their 21st century skills and those of their students. Finally, teachers should utilize technology that aligns with curricular standards (Garet et al., 2001; Hew & Brush, 2007; Hutchinson &

Woodward, 2014). When teachers are able to utilize professional development sessions to help them link specific areas of their curriculum with technology tools, they are more likely to collaborate on concepts, skills, and problems (Garet et al., 2001). With all these aspects, on-going professional development that is hands-on and targets 21st century skills as well as content, teachers may be more inclined to use technology in their everyday lesson plans.

Conducting a needs assessment. Needs assessments allow professionals the ability to use data-driven recommendations in order to solve current challenges and to identify gaps in performance (Morrison et al., 2013; Rossett, 1995). This study focuses on describing the needs prior to any type of recommendation for action through the use of focus group interviews and surveys. Rossett (1995) suggests that interviews are “the most prevalent needs assessment tool” (p.191) to determine how to incorporate newer technology, identify performance problems, and meet mandates. Surveys offer anonymity and are effective to gauge cause, feelings, and solutions (Rossett, 1995).

O'Reilly (2016) asserts there are eight key indicators that can be used to create a needs assessment for educational technology. The eight key indicators include: self-reported skills, technology use, teacher beliefs, barriers, professional development, leadership, needs, and demographics. These indicators will be useful when developing a needs assessment for educational technology-focused professional development.

Students' need for 21st century skills. We now live in a society that is faced with ever-changing technology. There are skills that are important to keep up with the demands of a technological society. The four major “C’s” that comprise 21st century skills include critical thinking, communication, collaboration and creativity and

innovation (NEA, n.d.). In a 2010 study, over 75% of executives believe that 21st century skills will be more important in the future (NEA, n.d.). It is imperative now, more than ever, for educators to incorporate these skills into their everyday lessons so that their students will be prepared for future careers. The National Education Association's report on preparing 21st century students for a global society (n.d.) shows critical thinking skills by reasoning effectively, using systems thinking, making judgments and decisions, and solving problems. Students should also communicate clearly their ideas and the instructions of others, both verbally and nonverbally, decipher meaning, and communicate in diverse environments (NEA, n.d.). Collaboration can be evident when students work effectively with a diverse group, work with flexibility and compromise to achieve a common goal, and accept responsibility for group decisions (NEA, n.d.). Twenty-first century learners and professionals should be able to think creatively by brainstorming, creating ideas, improve upon their existing ideas with others (NEA, n.d.). Teachers need to ensure that students are prepared to meet the demands of the workforce; therefore, educator training and support are needed to foster 21st century skills for students (Bond, 2015; Gunn & Hollingsworth, 2013; Johnson, 2014).

Chapter Summary

Professional development is needed to support teachers in enhancing their instructional practices using educational technology. However, obstacles stand in the way of teachers utilizing educational technology in a way that is inventive and aligns with curriculum mandates. Teachers may avoid using technology in the classroom because of difficulties with grasping the functionality of the technology or they may have a perceived lack of efficacy of educational technology (Pozzi, Persico, & Sarti,

2018). Barriers to professional development that improves the effective use of educational technology also include the lack of time and financial resources, and pressures from curricular expectations (Woo, 2016). In order to assist teachers with technology proficiency and technology-enhanced lessons, professional development must encourage and arrange collaboration, offer relevance in the curriculum, promote research-based instructional strategies, and provide coaching (Van Thiel, 2017). Teachers need useful and efficient professional development centered around educational technology to enable them to create curricular-focused, innovative lessons in the classroom.

The combination of sound pedagogy and effective use of technology can be achieved with enhanced educational technology-focused professional development that assists teachers realize the potential for technology integration in the classroom (Ertmer & Ottenbreit-Leftwich, 2010; Koehler & Mishra, 2009). Educational technology-focused professional development should combine content knowledge, pedagogical knowledge, and technical knowledge (Koehler & Mishra, 2009) and allow educators to learn and further enhance strategies to utilize in their classrooms (Cox, 2015; Knowles, 1978). When educators are prepared to increase the effective use of educational technology student learning will be positively impacted by authentic learning experiences that incorporate technology (Bond, 2015) with collaboration, creativity, critical thinking, and problem-solving (Beeson, 2013; Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2016).

As presented in the literature review, current professional development models that target the use of educational technology in the classroom do not always equate to increased effective use of educational technology (Kale, 2018; McGee, 2105; White,

2014). Educational technology-focused professional development should be perceived as useful and relevant to hone the technological, pedagogical, and content knowledge of educators (Ertmer & Ottenbreit-Leftwich, 2010; Koehler & Mishra, 2009; Sheffield et al., 2018; Tweed, 2013; White, 2014). The infusion of on-going professional development (Garet et al., 2001; Hew & Brush, 2007), hands-on experience (Basagekar & Singhavi, 2017; Ekanayake & Wishart, 2015; Garet et al., 2001; Hew & Brush, 2007), opportunities to enhance their own and their students' 21st century skills (Beriswill, et al., 2016; Garet et al., 2001; Sheffield et al., 2018), and curriculum alignment (Garet et al., 2001; Hew & Brush, 2007; Hutchinson & Woodward, 2014) will increase the effective use of technology in classrooms. Utilizing a needs assessment will allow for data-driven recommendations to be made concerning effective educational technology-focused professional development.

CHAPTER 3

METHOD

The purpose of this action research was to identify and describe teachers' needs and administrator perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School in Central School District in order to make recommendations for future professional development.

Research Questions

1. What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?
2. What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?

Research Design

Teachers' needs and preferences for educational technology-focused professional development were the focus of my action research. Action research is an appropriate model to use because I focused my research on educators within my school in order to help bring positive change. Mertler (2009) asserts that action research "is to gather information about how instruction is delivered, how students learn, all of the components of the teaching and learning process, but in our own setting" (Mertler, 2009, p. 20). Although I did not engage with Lakeside High School students in the learning

process, their educators were my participants. As a stakeholder, I collected data in order to improve the use of educational technology in the classrooms of the school in which I teach. Kemmis (2009) observes that action research gives “practitioners intellectual and moral control over their practice...a practice-changing practice, is a self-reflective process by which they remake their practice for themselves” (p. 468).

Action research is a continuous process that offers the researcher the ability to plan, implement, and reflect on the outcomes of research by analyzing data (Mertler, 2009). The analysis portion is important because it allows the practitioner-researcher the opportunity to utilize information from data collection to improve their teaching (Carr, 2006; Huang, 2010; Melrose, 2001; Mertler, 2009). More specifically, action research is a means for becoming an agent of change in your local community and sharing your transformative research findings with others (Huang, 2010).

Action research “is a social process, participatory, collaborative, emancipatory, critical, and recursive” (Atweh, Kemmis, & Weeks, 1998, p. 119). Although the research by Atweh et al. (1998) focuses on student behaviors, the same may be said of action research for educators. These characteristics focus attention on working as a member of a community for positive change. Practitioners can benefit from action research by uncovering counterproductive practices that limit student growth in the classroom, changing the counterproductive practices, and reevaluating their newly developed practices (Mertler, 2009; Elliot, 1987).

My research on uncovering teachers’ needs and preferences for educational technology-focused professional development focused on increasing effective professional development methods that employed multiple qualitative and quantitative

methods, called mixed-methods. Mixed-methods research has the potential to clarify and explain relationships, explore relationships in-depth, and cross-validate relationships that are discovered through research (Fraenkel, Wallen, & Hyun, 2015). This systematic approach to data collection revealed commonalities and themes to draw conclusions concerning the best methods of educational technology-focused professional development. These themes and conclusions can lead to more impactful professional development that may also result in effective implementation of educational technology in classrooms.

Setting and Participants

The setting for this descriptive study is Lakeside, a high school in a southeastern state with an Excellent state rating. This school has been recognized for many awards such as Palmetto's Finest High School, Varsity Brands Most Outstanding Student Section, a consistent U.S. News Best High School, multiple fine arts awards, and numerous athletic state champions. Lakeside High School boasts excellence inside and outside of the classroom. There are nearly 1,400 students, ranging from 9th to 12th grade, and 88 faculty members at Lakeside High School.

Participants

The teacher-participants, all full- and part-time faculty members of Lakeside High School, were given the opportunity to fill out a Google Form survey (see Appendix B) via email (see Appendix A). Their names were not collected to ensure anonymity, but they had to use their district email address to ensure that respondents were teachers at CHS. The Google Form was set to allow only one response per email address. There are 88 faculty members at Lakeside High School. My goal was to receive survey responses

from at least 30% of the teachers. Nonresponse can be a threat to external validity (Kalaian & Kasim, 2008). I included all data received from any faculty member who completed the survey.

All teachers were invited to participate in follow-up focus group interviews (see below for full description). I used purposive sampling (Fraenkel, Wallen, & Hyun, 2012) to collect qualitative teacher-focus group interview data. An email (see Appendix C) was sent to all full- and part-time faculty at Lakeside High School. The email requested their participation in a group interview and asked for volunteers who had various opinions regarding educational technology-focused professional development. From the volunteers, I selected thirteen faculty members that comprised three focus groups and confirmed consent (see Appendix D) during the interview. Each focus group had three to five faculty members (see Table 3.1). The criteria used to select members for each focus group included the following:

- content-areas (e.g., science, social studies, physical education, etc.),
- number of years teaching,
- varied technology ability

Table 3.1. *Summary of Teacher-participants*

Focus Group	Pseudonym	Number of Years Teaching	Content-area and Other Information
1	Stacy	10	English; Master's +30 EdTech
	Donna	35	Social Studies; EdD
	Kaitlyn	4.5	Health Science; Nurse for 23 years
	Malachi	15	English
	Jenny	14	Science
2	Nora	30	Special Education
	Penelope	21	Science
	Delilah	22	English
3	Sadie	15	Social Studies; mom of young twins
	Jasmine	11	Art

Focus Group	Pseudonym	Number of Years Teaching	Content-area and Other Information
	Rick	29	Social Studies and Physical Education
	Jackie	27	World Languages; TTL
	Linda	9	Science

I emailed all administrators to ask them to participate in two focus group interviews (see Appendix E). There were a total of five administrators who were able to participate in the focus group interviews (see Figure 3.2). All administrator-participants confirmed consent by participating in the interview (see Appendix F). Focus group meeting times depended on the flexibility of their schedules which occurred soon after the end of the academic school year.

Table 3.2. *Summary of Administrator-Participants*

Focus Group Number	Pseudonym	Number of Years in Administration	Other Information
1	Arnold	22	Administrator
	Beverly	15	Administrator
2	Mitchell	12	Administrator
	Carla	6	Digital Integration Specialist
	Lisa	6.5	Administrator; prior experience at district- and state-level

Data Collection

Two data collection methods were used to explore my research questions. Quantitative and qualitative data collection methods were employed during the data collection process. The quantitative data was collected through a teacher-survey while the qualitative data was obtained through teacher- and administrator-focus group interviews. Table 3.3 provides the alignment between my research questions and data collection methods.

Table 3.3. *Research Questions and Data Sources*

Research Questions	Data Sources
1. What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?	<ul style="list-style-type: none"> • Survey • Focus Group Interviews
2. What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?	<ul style="list-style-type: none"> • Focus Group Interviews

Survey

An email was sent (see Appendix A) to all teachers at Lakeside High School to request their participation in a survey. I conducted the teacher survey using Google Forms (see Appendix B). Surveys are advantageous in research because they provide timely and varied data (Mertler, 2017). Surveys also allow for a larger sample size to collect quantitative data to describe the population (Fraenkel et al., 2015). The purpose of my survey was to provide quantitative data for my first research question. The survey included five sections created in cooperation with a colleague. The first section consisted of demographic questions. Each section of the survey was composed utilizing a variety of established surveys adapted for our specific research questions (Woods, 2015; Vannatta & Banister, 2009; Hixson, Ravitz, & Whisman, 2012; Torff & Sessions, 2008). Table 3.4 illustrates the alignment between the research question and four of the five survey sections. The established surveys were tested for reliability with scores ranging from $\alpha = .85$ and higher. Our survey included different rating scales and incomplete question sets from the established surveys. Therefore, we will perform a Cronbach's alpha analysis (Mertler, 2017; Fraenkel et al., 2015) to determine internal reliability for our survey. In order to ensure our survey had validity, the survey was also

reviewed by a panel of experts (Fraenkel et al., 2015). Any suggestions regarding the survey questions were considered for subsequent revisions.

Table 3.4. *Research Questions and Survey Prompts Alignment*

Research Question	Survey Sections
1. What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?	<ol style="list-style-type: none"> 1. Ratings of Personal Technology Skills <ul style="list-style-type: none"> ○ 25 self-rating Likert-scale questions 2. Ratings of Thoughts on Technology Integration and Reflection of Diffusion of Innovation (Rogers, 2001) <ul style="list-style-type: none"> ○ 22 self-rating Likert-scale questions ○ 1 self-identification statement 3. Ratings of Thoughts about Teaching and Learning (amount of time technology is used to promote 21st century skills) <ul style="list-style-type: none"> ○ 17 self-rating Likert-scale questions 4. Ratings of Thoughts on Technology Professional Development <ul style="list-style-type: none"> ○ 5 self-rating Likert-scale questions

The first section collected demographic data. Demographic information was used to describe the participants. The second section, thoughts on personal technology skills, consists of 15 prompts that had teachers rate their perception of their technology skills by categorized their skills. The 15 prompts were modified from Woods (2015). The participants had the option to identify themselves as learners (I am not sure how to do the task), Basic (I have done this before, but might need some help), Proficient (I can perform this task without any assistance), or Advanced (I can train staff how to do this). An example of technology skill prompt includes:

- Create forms and assessments using Google Forms.

Also included in the second section were ten prompts with a 5-point Likert scale rating that prompted teachers to analyze their technology skills. These questions are directly from Vannatta and Banister's (2009) Teacher Technology Integration Survey (TTIS). The choices were based on a 5-point Likert scale which included strongly disagree, disagree, neutral, agree, or disagree. An example of a prompt allows teachers to rate their perception of their technology skills from learner to advance is below:

- I get anxious when using new technologies because I don't know what to do if something goes wrong.

The third section, thoughts on technology integration, consists of 22 prompts that had teachers rate based on a 5-point Likert scale. This section also included five prompts that reflect their overall view as it relates to integrating technology in the classroom. The first 10 prompts were modified from Woods (2015) and the next 12 prompts were obtained from Vannatta and Banister's (2009) TTIS. An example of two prompts that reflect their overall view of technology integration include:

- The amount of time needed to prepare technology-based lessons deters me from creating them.
- When planning instruction, I think about how technology could be used to enhance student learning.

There were five statements that described various comfort and ability levels when deciding to incorporate technology tools in the classroom. The last item of this section included five statements that were based on the diffusion of innovation (Rogers, 2001). Teachers were able to select one that most closely reflected their overall view as it relates to integrating technology in their classroom. The five statements are below:

- I am comfortable with my current use of technology. I use what has always worked for me and my students. I will adopt a new technology only if I know it will not fail on me. Technology is always changing, I do not want to have to constantly relearn the newest fad.
- I will use technology in my classroom due to increasing pressures from my colleagues and/or administration. I am skeptical of new technology and do not adopt new technology until I know that it will work for me and my students in my classroom.
- I am often asked for advice concerning technology integration from my colleagues. I am in a leadership role and/or have been asked to assist others in my school and/or district in implementing new technologies in the classroom. I may not be apt to adopting the newest technology, but I am respected, and my expertise is valued when I implement new technology.
- I adopt the use of new technology before the average educator. I frequently interact with my peers, but do not necessarily hold a leadership position. I deliberate for some time prior to adopting a new technology. I don't want to be the first to adopt new technology, but I certainly do not want to be the last.
- I am at the forefront of technology utilization in the classroom. If I see new, cutting-edge technologies that may benefit my students from my social media groups, I will venture into the unknown and test out the technology with my students. I am comfortable with a high degree of

uncertainty and do not feel the need to defend my integration of technology with my colleagues or administration.

The fourth section, thoughts about teaching and learning, consisted of 22 prompts that relate to 21st century skills (Ananiadou & Claro, 2009). The prompts in the fourth section came directly from the Hixson et al. (2014) study in conjunction with the Buck Institute for Education. These prompts allowed teachers to indicate how often they have their students participate in activities that promote 21st century skills. The options included almost never, a few times a semester, one to three times per month, one to three times per week, and almost daily. Two examples of prompts are below:

- Create joint products using contributions from each student.
- Generate their own ideas about how to confront a problem or question.

The fifth section, thoughts on technology professional development, consisted of five 5-point Likert scale prompts that rated how teachers perceived current educational technology-focused professional development. The prompts were adapted from Torff and Sessions (2008). They used a 6-point Likert scale, however, in order to maintain consistency within the instrument, this survey had a 5-point Likert scale that included strongly disagree, disagree, neutral, agree, and strongly agree. Two examples of the prompts are below:

- Technology professional development workshops often help teachers to develop new teaching techniques.
- If I did not have to attend technology in-service workshops, I would not.

Focus Group Interviews

Focus group interviews were conducted to collect qualitative data. The purpose of focus group interviews was to allow participants to reveal their true opinions about a particular topic while listening to the thoughts and opinions of others (Fraenkel et al., 2015). Focus group interviews are a useful way to mine information from a small group where they can feed off of each other's comments. It is important to maintain equal participation from all members to ensure all voices are heard (Mertler, 2017). The study included three teacher-focus groups with three members in one group and five members in the other two groups. The study also included two administrator-focus groups with two members in one group and three members in the other. The size of the groups ensured that each participant had the opportunity to share their opinions.

I conducted focus group interviews with teachers and administrators. An email was sent to all teachers at Lakeside High School (see Appendix C) to ask for participants and ensure consent. The focus group interviews were semi-structured, open-ended discussions. The interview protocol is based off the work by Byrd (2017). My interview protocol was slightly different from the original Byrd (2017) protocol (see Appendix D). The wording is slightly different and the question regarding time allotment for teachers to implement strategies is included in the previous base question as a probing question for the teacher-focus group interview. Administrators were also emailed (see Appendix E) to request their participation and ensure consent. However, the administrator interview questions are essentially the same except for the wording of some of the questions (see Appendix F) that accounted for administrators' perceptions of teachers. The interview protocol was aligned to the research questions (see Table 3.5). There are eight base

questions for the teacher-focus groups, while there are nine base questions for the administrator-focus group. These base questions were followed by more in-depth follow-up probes to gather thick, rich descriptions of participant perceptions. I conducted three teacher-focus group interviews with three to five teachers in each group. Based on the availability of administrators, I conducted two administrator-focus group interviews with our administrative team.

Table 3.5. *Research Questions and Focus Group Interview Questions Alignment*

Research Questions	Interview Questions
1. What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?	<ol style="list-style-type: none"> 1. How do you currently utilize technology in your classroom? 2. Tell me about a time when you experienced difficulties when integrating technology in your classroom and/or curriculum? 3. Give an example (or more) a time when you felt supported by your school so that you could integrate technology into your daily instruction for teaching and learning? 4. Discuss some of the professional development you have participated in on the use of technology (i.e., workshop, college courses, seminars, etc.) focusing on the use of technology in the classroom? If the answer is no, proceed to 4d. <ol style="list-style-type: none"> a. How often do you attend technology-based professional development? b. What do you like the most about the professional development sessions? c. What do you like the least about the professional development sessions? d. Why have you not participated in a professional development? 5. How has technology-based professional development helped with the implementation of technology into your daily classroom instruction? <ol style="list-style-type: none"> a. Give an example of a strategy or strategies you have learned in your technology-focused professional development that you have used or would like to use in your classroom. b. How do you feel about the time allocated for teachers to practice the implementation of

Research Questions	Interview Questions
	<p>strategies learned from technology-based PD sessions?</p> <p>c. How do you feel about the time allocated to consult with their peers concerning integrating technology into their curriculum?</p> <p>6. In general, how do you feel about your competency and comfort level once you have completed a technology-based professional development session?</p> <p>7. What changes (if any) would you like to see to help you better integrate technology into your curriculum?</p> <p>8. Describe your ideal technology-based professional development session. What makes it ideal?</p>
2. What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?	<p>1. For what purpose or goal should teachers use technology in their classrooms?</p> <p>2. What difficulties have you encountered as teachers try to integrate technology in their curriculum?</p> <p>3. How does your school support teachers with integrating technology into their daily instruction for teaching and learning?</p> <p>a. Please discuss a time when supports enabled a teacher (or teachers) to successfully implement a technology-based strategy in their classroom.</p> <p>b. Please discuss a time(s) when supports were not successful and prohibited a teacher (or teachers) to successfully implement one or more technology-based strategy(ies) in their classroom.</p> <p>4. Describe how teachers are able to participate in professional development that focuses on the use of technology in the classroom?</p> <p>a. How often are they able to attend technology-based professional development?</p> <p>b. What do you like the most about the professional development sessions?</p> <p>c. What do you like the least about the professional development sessions?</p> <p>d. Why do you think teachers choose not to participate in professional development focused on technology?</p> <p>5. How do you feel about the time allocated for teachers to:</p> <p>a. Practice the implementation of strategies learned from technology-based PD sessions?</p> <p>b. Consult with their peers concerning integrating technology into their curriculum?</p>

Research Questions	Interview Questions
	6. How has technology-based professional development helped with the implementation of technology into daily classroom instruction? 7. In general, how do you feel about the competency and comfort level of your teachers once they have completed a technology-based professional development session? 8. What changes (if any) would you like to see to help teachers better integrate technology into the curriculum? 9. Describe the ideal technology-based professional development session. What makes it ideal?

Procedures and Timeline

The timeline for the procedures for this research were as follows: Stage 1: Participant Identification and Survey Data Collection, Stage 2: Participant Identification for Focus Group Interview, Stage 3: Focus Group Data Collection, and Stage 4: Data Analysis. Table 3.6 details the stage, expectation, and time frame for this study. The details of each stage are described in detail below.

Table 3.6. *Timeline of Participant Identification, Data Collection, and Data Analysis*

Stage	Activities	Time Frame
Stage 1: Participant Identification and Survey Data Collection	1. Send an email to all faculty with survey attached. 2. Willing participants fill out consent forms and survey. 3. Data will be collected via Google Forms and Google Sheets. 4. Reminder emails will be sent to all teachers to encourage participation. 5. The Google Form will be set to only accept responses from school Gmail one time.	2 weeks

Stage	Activities	Time Frame
Stage 2: Participant Identification for Focus Group	<ol style="list-style-type: none"> 1. Send an email to all full-time and part-time teachers to encourage participation in upcoming focus group. 2. Teachers who are willing to participate in the focus group will be contacted if they are selected. 3. Teacher-participants will be selected based on criteria ensure diversity in content-area representation and number of years teaching. 4. Two to three groups of three to five teachers will be selected to participate in the focus group interview. 5. Participants fill out consent and assent forms. 	2 weeks
Stage 3: Focus Group Data Collection	<ol style="list-style-type: none"> 1. Teacher Group 1 will meet for focus interview 2. Teacher Group 2 will meet for focus interview 3. Administrator Group will meet for focus interview or individual interviews 	4 weeks
Stage 4: Data Analysis	<ol style="list-style-type: none"> 1. Demographic data analyzed with descriptive statistics 2. Likert-scale data analyzed with descriptive statistics 3. Focus group interview transcribed 4. Initial coding and inductive analysis of transcription 	8 weeks

Stage 1: Participant Identification and Survey Data Collection

Participant identification for this study began in the spring of 2019 by sending an email (see Appendix A) to all full-time and part-time faculty members at Lakeside High School. The email contained an introduction to the study that included the problem statement and research questions. The email also contained the required consent and link to the survey (see Appendix B) produced through Google Forms. Teachers were encouraged to voluntarily participate in the study. Those who were willing to participate provided consent by completing the survey attached to the email. The survey was open

for twelve days. After one week and again before the end of the allotted time, I sent a reminder email to all teachers.

Stage 2: Participation Identification for Focus Groups

In order to identify participants for the teacher focus groups, I sent an email (Appendix C) to all full-time and part-time faculty members at Lakeside High School. The email contained an introduction to the study and a request to participate as a focus group member. All teachers who were willing to participate replied to the email to verify their willingness to participate. Those who were willing to participate were contacted if they were selected to be in one of the three focus group interviews (Appendix D). Each focus group had three to five teachers.

Administrators comprised two additional focus groups. There was a total of four administrators and a digital integration specialist at Lakeside High School. I arranged times that at least two to three administrators could meet. Based on scheduling, the administrator-focus group interviews occurred after the end of the regular school year. The administrator interviews lasted between 30 to 45 minutes.

Stage 3: Focus Group Data Collection

I met with each teacher-focus group one time for approximately one hour. The time set to meet was dependent on the teachers' schedules. One teacher-focus group interview occurred before school while the other two teacher-focus group interviews occurred after school. I also met with the administrator-focus groups after the end of the regular school year. The time was be dependent on their collective schedules.

Stage 4: Data Analysis

The survey demographic data was analyzed using descriptive statistics. The Likert-scale questions were analyzed by calculating the means and standard deviations and the percentage of teachers in each demographic area was calculated. A Cronbach's alpha was calculated for each of the subscales to determine the reliability of the data. The Diffusion of Innovation prompt was analyzed with a Chi-square Goodness-of-fit test to compare against the predicted values from Rogers (2001).

The focus group interviews were recorded. Each recording was be transcribed using an online program called Temi. Using an online program called Delve, I conducted initial coding and inductive analysis of the transcriptions in order to reveal any emergent patterns and key themes that resulted from the interviews. The key themes from the teacher- and administrator-focus group interviews were analyzed to provide a basis for my recommendations for future educational technology-focused professional development.

Data Analysis

Quantitative data results from the teacher surveys are presented in the initial section of data analysis. Qualitative data results were collected during teacher- and administrator-focus group interviews and were analyzed after the quantitative data analysis. Quantitative and qualitative data were collected and triangulated in order to validate findings. Triangulation of data that is of equal importance enabled me to have a deeper understanding of the research problem and ultimately lead to greater credibility of results between quantitative and qualitative data (Creswell, 2017; Mertler, 2017). This mixed-methods research enabled me to collect quantitative demographic and teacher

perception data as well as qualitative teacher and administrator perception data. These sources of quality data were used to make recommendations to improve educational technology-focused professional development. Table 3.6 depicts the type of information, data sources, methods of obtaining data, and data analysis methods.

Table 3.7. *Data Sources Alignment*

Type of Information	Data Sources	Method	Data Analysis
Demographic	Descriptive information	<ul style="list-style-type: none"> • Survey 	<ul style="list-style-type: none"> • Percentages of demographic information were presented and analyzed
Perceptual	Experiences with use of technology in the classroom	<ul style="list-style-type: none"> • Likert-scale survey • Focus Group Interviews 	<ul style="list-style-type: none"> • Descriptive statistics were used to calculate overall ratings of Likert-scaled prompts and demographic information
Research Question #1: What are teachers' needs and preferences for educational technology- focused professional development at Lakeside High School?	Teacher-participants' ratings, descriptions, and explanations of needs and preferences of educational technology focused professional development	<ul style="list-style-type: none"> • Likert-scale survey • Focus Group Interviews 	<ul style="list-style-type: none"> • Descriptive statistics were used to calculate overall ratings of Likert-scaled prompts. • Chi-square Goodness of Fit test was used to analyze diffusion of innovation prompt. • Qualitative data was collected and analyzed with a data analysis spiral.

Type of Information	Data Sources	Method	Data Analysis
Research Question #2: What are administrators' perceptions of teachers' needs and preferences for educational technology- focused professional development at Lakeside High School?	Administrator- participants' descriptions and explanations of needs and preferences of educational technology- focused professional development	<ul style="list-style-type: none"> • Focus Group Interviews 	<ul style="list-style-type: none"> • A comparison of teachers and administrators was analyzed to make recommendations for future educational technology- focused professional development.

Rigor and Trustworthiness

In order to maintain rigor and trustworthiness I used 1) triangulation, 2) audit trail, 3) member checking, and 4) peer debriefing. Each strategy is detailed below.

Triangulation

Triangulation occurs with action research and mixed-methods research designs because they typically rely on multiple methods of data collection strategies (Mertler, 2017). Methodological triangulation of data is beneficial by increasing validity and decreasing inadequacies of any given method of research completed individually (Bekhet & Zauszniewski, 2012). Qualitative data reinforces quantitative data collection methods by enhancing the understanding of specific situations in particular setting, and providing thick, rich descriptions (Leech & Onwuegbuzie, 2007). For these reasons mentioned, I used a mixed-methods approach to obtain quality data that are valid and reliable.

Member checking

Member checking results when participants in a study are asked to determine if the results of the study accurately reflect the researcher's conclusions (Mertler, 2017). At the completion of all data analyses, I utilized member checking with participants of the

study to ensure results are accurate and representative of their voices. In their research, Madill and Sullivan (2017) found that “member checks provide the opportunity for researchers to reflect on the interaction and, potentially, to transform their understanding of what is important to stakeholders and/or to gain insight into their own blind spots” (p. 15).

Audit Trail

All data and decision-making were documented through an audit trail. Audit trails provide a means for a researcher to account for all decisions and analyses through the course of a study (Carcary, 2009). Authentication of actual data that provides raw data, analyses, interpretations, process documentation, expectations, and document the analysis of data and allows for reflection is an important aspect qualitative methods (Carcary, 2009). I maintained meticulous records of all data in order to ensure transparency, validity, and reliability of all results and conclusions.

Peer Debriefing

Similarly, peer debriefing with my dissertation chair and committee, and my student colleagues have validated my findings. “Peer debriefing is the act of using other professionals (perhaps a colleague or a critical friend) who can help you reflect on the research by reviewing and critiquing your processes of data collection, analysis, and interpretation” (Mertler, 2017, p. 143). Peer debriefing allows for transparency to ensure quality in research practices (Collins, Onwuegbuzie, Johnson, & Frels, 2013). Peer debriefing also allows for the opportunity to reflect on my findings based on an evaluation of individuals not involved in the study (Fraenkel et al., 2015).

Plan for Sharing and Communicating Findings

Sharing and communicating findings in action research is important because it allows the researcher to make recommendations that impact their local area (Mertler, 2017). By sharing my findings of educational technology-focused professional development, I can make recommendations that may potentially meet the needs and preferences of my participants. Each participant (teacher and administrator) in my study received an electronic copy of findings and my recommendation for further educational technology-focused professional development sessions. I also met with a cohort of teachers and the school-level administration team regarding future participation in and planning of educational technology-focused professional development sessions.

There are numerous conferences that can benefit from a session on professional development with an emphasis on planning for effective teacher technology integration. State EdTech (a pseudonym) and the Central Summit (a pseudonym) are multi-day conferences targeted toward educators and administrators who seek a variety of sessions revolving around the use of technology in schools. Sessions range from instructional strategies and best practices with technology, administrative issues regarding educational technology, and updates in educational technology. My session included recommendations for educational technology-focused professional development based on my research findings.

CHAPTER 4

ANALYSIS, FINDINGS, AND INTERPRETATIONS

The purpose of this action research was to identify and describe teachers' needs and administrators' perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School in Central School District in order to make recommendations for future professional development. Quantitative and qualitative data were collected and analyzed to answer two research questions: (1) What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School? and (2) What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School? This chapter describes the analysis and findings of data collected in the study in the form of a teacher survey, teacher-focus group interviews, and administrator-focus group interviews. The quantitative data will be discussed followed by the qualitative data.

Quantitative Analysis and Findings

Quantitative data were collected in the form of a survey from teachers at Lakeside High School in March of 2019. Each section of the survey was composed using established surveys (i.e., Hixson et al., 2012; Torff & Sessions, 2008; Vannatta & Banister, 2009; Woods, 2015). The established surveys had reported reliability with scores ranging from $\alpha = .85$ and higher. The subscales of the survey, reports of reliability,

descriptive statistics, inferential statistics, and statements of significance are included below. Survey data were collected from 62 faculty members.

Five survey sections were broken into 10 subscales. The following were subscales from the survey: 1) Personal Technology Skills, 2) Risk-taking Behaviors and Comfort with Technology, 3) Confidence with Integrating Educational Technology in the Classroom, 4) Perceived Benefits of Technology Use, 5) Beliefs and Behaviors about Classroom Technology Use, 6) Thoughts about Teaching and Learning: Critical Thinking Skills, 7) Thoughts about Teaching and Learning: Collaboration Skills, 8) Thoughts about Teaching and Learning: Communication Skills, 9) Thoughts about Teaching and Learning: Creativity and Innovation Skills, and 10) Thoughts on Educational Technology-focused Professional Development.

Description of subscales. The reliability of subscales in the survey were measured with Cronbach's alpha. Data from two different studies, one from the school from this action research study and the other from another district nearby, were used to determine reliability ($n = 145$). The Cronbach's alpha for the subscales ranged from .65 to .89 (see Table 4.1). According to Manerikar and Manerikar (2015), Cronbach's alpha values between .60 and .70 have an acceptable internal consistency. Therefore, the subscale concerning "Thoughts about Teaching and Learning: Communication Skills" ($\alpha = .65$) and "Thoughts on Educational Technology-focused Professional Development" ($\alpha = .66$) will be discussed; however, findings from these subscales should be considered tentative.

Table 4.1. *Subscales, Item in each Subscale, Cronbach's alpha*

Subscales with Item Numbers	Cronbach's alpha
Risk-taking Behaviors and Comfort with Technology (Items 16-24; 17, 18, 20 are reversed)	.75
Confidence with Integrating Educational Technology in the Classroom (Items 25-29)	.87
Perceived Benefits of Technology Use (Items 36-40)	.81
Beliefs and Behaviors about Classroom Technology Use (Items 41-46)	.87
Thoughts about Teaching and Learning: Critical Thinking Skills (Items 48-53)	.89
Thoughts about Teaching and Learning: Collaboration Skills (Items 54-59)	.88
Thoughts about Teaching and Learning: Communication Skills (Items 60-64)	.65
Thoughts about Teaching and Learning: Creativity and Innovation Skills (Items 65-69)	.85
Thoughts on Educational Technology-focused Professional Development (Items 32, 34, 70-77; 33, 34, 71, 74 are reversed)	.66

Note. Subscales with corresponding item numbers are listed. There were a total of six items that were reversed in two subscales as noted in the table.

Personal technology skills. Participants were asked to self-report their personal technology skills (see Table 4.2). The personal technology skills focused on potential applications and processes that can be utilized in the classroom. These 15 items had scales of (1) Learner: I am not sure how to do this task, (2) Basic: I have done this before, but might need some help, (3) Proficient: I can perform this task without any assistance, and (4) Advanced: I could train staff to do this.

For most items, the mean response indicated that the participants considered themselves proficient. However, the mean response for creating a functioning web page ($M = 2.62$; $SD = 0.93$), taking and editing digital pictures ($M = 3.23$; $SD = 0.78$), taking

and editing digital videos ($M = 2.75$; $SD = 0.91$), analyzing data in spreadsheets ($M = 2.87$; $SD = 1.02$), embedding videos in presentations ($M = 3.20$; $SD = 0.95$), creating forms ($M = 3.13$; $SD = 0.94$), troubleshooting ($M = 2.74$; $SD = 0.91$), and monitoring student devices ($M = 2.75$; $SD = 0.99$) were between the basic to proficient levels. Of the eight items mentioned previously, note that seven of the items had large variances ($SD \geq 0.9$).

Table 4.2. *Personal Technology Skills*

Item	M	SD
Create a functioning web page	2.62	0.93
Take and edit digital pictures on my device	3.23	0.78
Take and edit digital video on my device	2.75	0.91
Download digital images and videos from my device to my computer	3.38	0.78
Analyze data and create graphs in Microsoft Excel/Google Sheets	2.87	1.02
Create slide presentations using PowerPoint or Google Slides	3.59	0.64
Embed video into my presentations	3.20	0.95
Create a Word Document or Google Doc	3.79	0.41
Save files using different file extensions (i.e. save a Word document as a PDF)	3.61	0.61
Find lessons on the web	3.66	0.54
Create classes and utilize Google Classroom for productivity and instruction	3.36	0.78
Share Google Docs, Slides, or Sheets with different user rights (view only, edit, make comments)	3.53	0.67
Create forms and assessments using Google Forms	3.13	0.94
Troubleshoot issues with your device or student devices in the classroom (i.e., apps freezing up, loss of connection, etc.)	2.74	0.91
Use Hapara to monitor and control my student Chromebooks	2.75	0.99

Risk-taking behaviors and comfort with technology. The first subscale items concerned teachers' risk-taking behaviors and comfort with technology. There were five levels in the self-reported ranges. The ranges included 1: Strongly Disagree to 5: Strongly Agree. The participants' self-reported ratings (see Table 4.3) indicated that they feel comfortable about taking risks and using technology. The responses were near the 4:

Agree level. The items that were reversed (learning new technologies is confusing for me, I get anxious when using new technologies, and I get anxious when using technology with my students) were close to the 2: Disagree level, but also had a large variance.

Teachers indicated that they did not feel confused when learning new technologies ($M = 2.15$, $SD = 1.15$), they are not anxious when using new technologies ($M = 2.21$, $SD = 1.17$), and they do not get anxious when using new technology with students ($M = 2.02$, $SD = 1.07$). Confidence in troubleshooting ($M = 3.71$, $SD = 1.07$), excitement when showing new technology tools ($M = 3.87$, $SD = 0.92$), confidence learning new technologies independently ($M = 3.98$, $SD = 0.96$), and the importance of learning new technology ($M = 3.92$, $SD = 0.90$) were all near the 4: Agree level, but also showed large variance.

Table 4.3. *Risk-taking Behaviors and Comfort with Technology Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
I feel comfortable about my ability to work with digital technologies.	4.26	0.85
*Learning new technologies is confusing for me.	2.15	1.15
*I get anxious when using new technologies because I don't know what to do if something goes wrong.	2.21	1.17
I am confident with my ability to troubleshoot when problems arise while using technology.	3.71	1.07
*I get anxious when using technology with my students.	2.02	1.06
I get excited when I am able to show my students a new technology application or tool.	3.87	0.92
I am confident in trying to learn new technologies on my own.	3.98	0.96
I enjoy finding new ways that my students and I can use technology in the classroom.	3.85	0.87
Learning new technologies that I can use in the classroom is important to me.	3.92	0.90

Note. The asterisk indicates items that were reversed for the Cronbach alpha analysis.

Confidence with integrating educational technology in the classroom. The second subscale on the survey, Confidence with Integrating Educational Technology in

the Classroom, included five items with one item reversed (see Table 4.4). There were five levels in the self-reported ranges. The ranges included 1: Strongly Disagree to 5: Strongly Agree. Based on the data collected the participants were close to the 4: Agree level for four of the items. However, participants were closer to 3: Neutral for “The amount of time needed to prepare technology-based lessons deters me from creating them.” This item also had the largest variance ($SD = 1.14$) of the items in this subscale. “I believe that integrating technology into my curriculum is important for student success” also had a high variance ($SD = 1.03$).

Table 4.4. *Confidence with Integrating Educational Technology in the Classroom Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
I feel confident in my ability to integrate multiple technologies into my instruction.	3.90	0.96
Integrating technology is pertinent to my curriculum.	3.90	0.96
I have a good variety of ideas and lessons for integrating technology into my teaching.	3.79	0.97
*The amount of time needed to prepare technology-based lessons deters me from creating them.	3.16	1.14
I believe that integrating technology into my curriculum is important for student success.	3.82	1.03

Note. The asterisk indicates items that were reversed for the Cronbach alpha analysis.

Perceived benefits of technology use. The third subscale, Perceived Benefits of Technology Use, included five items (see Table 4.5). There were five levels in the self-reported ranges. The ranges included 1: Strongly Disagree to 5: Strongly Agree. Four of the five items were very close to the 4: Agree level. The last item in the subscale was between the 3: Neutral and 4: Agree levels. The item concerning organization had the largest variance ($SD = 1.05$).

Table 4.5. *Perceived Benefits of Technology Use Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
Using technology to communicate with others allows me to be more effective in my job.	4.15	0.81
Digital technology allows me to create materials that enhance my teaching.	4.07	0.79
Digital technologies help me be better organized in my classroom.	3.85	1.05
Technology can be an effective learning tool for students.	4.18	0.72
My students get excited when they use technology in the learning process.	3.49	0.79

Beliefs and behaviors about classroom technology use. The fourth subscale, Beliefs and Behaviors about Classroom Technology Use, included five items (see Table 4.6). There were five levels in the self-reported ranges. The ranges included 1: Strongly Disagree to 5: Strongly Agree. Based on the means of each item, teachers mostly agree that instruction with technology integration should be embedded in their curriculum. Teachers are mostly neutral when they “Considering state and national technology standards” into planning for instruction, which also had the highest variance of the subscale ($SD = 1.27$). Two other items, “Using technology in the classroom is a priority for me” and “I regularly plan learning activities/lessons in which students use technology” had a relatively high variance ($SD \geq 1.0$).

Table 4.6. *Beliefs and Behaviors about Classroom Technology Use Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
Teaching students how to use technology is a part of my job.	3.69	0.99
Using technology in the classroom is a priority for me.	3.53	1.01
When planning instruction, I think about how technology could be used to enhance student learning.	3.71	0.93
When planning instruction, I consider state and national technology standards.	3.16	1.27
I regularly plan learning activities/lessons in which students use technology.	3.74	1.08
I try to model effective technology use for my students.	4.07	0.85

Thoughts about teaching and learning: critical thinking skills. The fifth subscale, Thoughts about Teaching and Learning: Critical Thinking Skills, included six items. The stem for the items asked, “How often do you have your students participate in the following activities in class?” There were five levels in the self-reported ranges. The ranges included 1: Almost Never to 5: Almost Daily (5). The items had means that indicated that they utilized critical thinking skills approximately 1-3 times per month ($M = 2.79$ to 3.64). This subscale had a high degree of variance ($SD > 1.1$) for each item.

Table 4.7. *Thoughts about Teaching and Learning: Critical Thinking Skills Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
<i>How often do you have your students participate in the following activities in class?</i>		
Compare information from different sources before completing a task or assignment.	2.79	1.28
Draw their own conclusions based on analysis of numbers, facts, or relevant information.	3.62	1.19
Summarize or create their own interpretation of what they have read or been taught.	3.64	1.25
Analyze competing arguments, perspectives, or solutions to a problem.	3.39	1.32
Develop a persuasive argument based on supporting evidence or reasoning.	2.98	1.31
Try to solve complex problems or answer questions that have no single correct solution or answer.	3.31	1.36

Thoughts about teaching and learning: collaboration skills. The sixth subscale, Thoughts about Teaching and Learning: Collaboration Skills, included six items. The stem for the items asked, “How often do you have your students participate in the following activities in class?” There were five levels in the self-reported ranges. The ranges included 1: Almost Never to 5: Almost Daily (5). Teachers indicated that they allowed students to “work in pairs or small groups to complete tasks together” 1-3 times

per week ($M=3.79$). The rest of the times had means near the 1-3 times per month rating ($M=2.69$ to 3.00). Each item in this scale had a high degree of variance ($SD > 1.0$).

Table 4.8. *Thoughts about Teaching and Learning: Collaboration Skills Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
<i>How often do you have your students participate in the following activities in class?</i>		
Work in pairs or small groups to complete a task together.	3.79	1.08
Work with other students to set goals and create a plan for their team.	3.00	1.30
Create joint products using contributions from each student.	2.87	1.28
Present their group work to the class, teacher, or others.	2.69	1.12
Work as a team to incorporate feedback on group tasks or products.	2.84	1.14
Give feedback to peers or assess other students' work.	2.75	1.16

Thoughts about teaching and learning: communication skills. The seventh subscale, Thoughts about Teaching and Learning: Communication Skills, included five items (see Table 4.9). The stem for the items asked, “How often do you have your students participate in the following activities in class?” There were five levels in the self-reported ranges. The ranges included 1: Almost Never to 5: Almost Daily (5). Two of the items, “Structure data for use in written products or oral presentations (e.g. creating charts, tables, or graphs)” and “Prepare and deliver an oral presentation to the teacher or others” were done only a few times a semester ($M=2.44$; $M=2.21$). The other three items in the subscale had a mean response that indicated the activities occurred between 2: A Few Times a Semester and 3: 1-3 Times per Month. Each item in this scale had a high variance ($SD > 1.0$).

Table 4.9. *Thoughts about Teaching and Learning: Communication Skills Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
<i>How often do you have your students participate in the following activities in class?</i>		
Structure data for use in written products or oral presentations (e.g. creating charts, tables, or graphs).	2.44	1.26
Convey their ideas using media other than a written paper (e.g. posters, video, blogs, etc.)	2.61	1.17
Prepare and deliver an oral presentation to the teacher or others.	2.21	1.02
Answer questions in front of an audience.	3.18	1.52
Decide how they will present their work or demonstrate learning.	2.87	1.19

Thoughts about teaching and learning: creativity and innovation skills. The eighth subscale, Thoughts about Teaching and Learning: Communication Skills, included five items (see Table 4.10). The stem for the items asked, “How often do you have your students participate in the following activities in class?” There were five levels in the self-reported levels. The levels included 1: Almost Never to 5: Almost Daily. Each item in the subscale had a mean response that indicated the activities occurred between 2: A Few Times a Semester and 3: 1-3 Times per Month. Each item in this scale had a high variance ($SD > 1.0$).

Table 4.10. *Thoughts about Teaching and Learning: Creativity and Innovation Skills Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
<i>How often do you have your students participate in the following activities in class?</i>		
Use idea creation techniques such as brainstorming or concept mapping.	2.89	1.16
Generate their own ideas about how to confront a problem or question.	3.15	1.12
Test out different ideas and work to improve them.	2.77	1.15
Invent a solution to a complex, open-ended question or problem.	2.66	1.29
Create an original product or performance to express their ideas.	2.66	1.29

Thoughts on educational technology-focused professional

development. Table 4.11 shows the results from the subscale Thoughts on Educational Technology-focused Professional Development. There were 11 items. There were five levels in the self-reported ranges. The ranges included 1: Strongly Disagree to 5: Strongly Agree. Of the 11 items, five items had a mean that suggested they 4: Agree with: “I enjoy attending technology-based professional development,” “Technology professional development workshops often help teachers to develop new teaching techniques,” “I have been enriched by the teacher technology training events I have attended,” “The technology professional development I have received could be easily applied in my classroom,” and “I feel adequately trained on the skills needed to use technology.” However, six of the 11 items teachers rated closer to 3: Neutral: “I want to use technology but am not given enough time to learn it,” “I want to use technology but have not been trained on how to use it,” “If I did not have to attend technology in-service workshops, I would not,” “Technology professional development events are worth the time they take,” “Technology staff development initiatives have not had much impact on my teaching,” and “I have enough opportunity to share technology lessons with other teachers.” Most items in this scale had high variance ($SD > 1.0$).

Table 4.11. *Thoughts on Educational Technology-focused Professional Development Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
I enjoy attending technology-based professional development.	3.61	1.12
*I want to use technology but am not given enough time to learn it.	3.48	1.16
*I want to use technology but have not been trained on how to use it.	2.69	1.16
Technology professional development workshops often help teachers to develop new teaching techniques.	3.61	1.05
*If I did not have to attend technology Inservice workshops, I would not.	2.92	1.35
Technology professional development events are worth the time they take.	3.39	1.14

Item	<i>M</i>	<i>SD</i>
I have been enriched by the teacher technology training events I have attended.	3.59	1.06
*Technology staff development initiatives have not had much impact on my teaching.	2.84	1.14
The technology professional development I have received could be easily applied in my classroom.	3.56	0.90
I feel adequately trained on the skills needed to use technology.	3.75	0.99
I have enough opportunity to share technology lessons with other teachers.	2.97	1.08

Note. The asterisk indicates items that were reversed for the Cronbach alpha analysis.

Survey items not part of a subscale. The survey included 3 items that were not a part of a subscale. These items were not a part of the instrument reliability. The ranges included 1: Strongly Disagree to 5: Strongly Agree. Based on the data in Table 4.12, participants indicated that they 4: Agree that they “have the technology skills necessary to support the students when they use technology for a project” and that they are “excited about using new technology in the classroom.” They are 3: Neutral “Most of my technology learning has been self-taught and on my own time.” This was the only item that had a high variance ($SD = 1.07$).

Table 4.12. *Items not Reported for Cronbach’s alpha Items, Mean, and Standard Deviation*

Item	<i>M</i>	<i>SD</i>
I have the technology skills necessary to support the students when they use technology for a project.	4.10	0.83
I get excited about using new technology in the classroom.	3.85	0.93
Most of my technology learning has been self-taught and on my own time.	3.36	1.07

Diffusion of Innovation. The survey included an item that asked participants to select a description that best reflected their overall view as it relates to integrating technology into their classroom. This item was not a part of a subscale. Due to an error

in this section of the original survey, a follow-up survey was sent to faculty members that included demographic information from the original survey (gender, subject, and number of years teaching) and only the item regarding the Diffusion of Innovation (Rogers, 2001). A total of 54 teachers responded to the survey, which was not quite as many as the original survey ($n = 62$). The number of participants at each level is provided (see Table 4.13 and Figure 4.1). The descriptions of the theory of Diffusion of Innovation (Rogers, 2001) levels were reflected in the survey, Level 1: Innovators, Level 2: Early Adopters, Level 3: Early Majority, Level 4: Late Majority, and Level 5: Laggards.

Table 4.13. *Items Related to Self-reported Diffusion of Innovation Descriptions ($n = 54$)*

Self-reported Description	Number of Participants
Level 1: Innovator I am at the forefront of technology utilization in the classroom. If I see new, cutting-edge technologies that may benefit my students from my social media groups, I will venture into the unknown and test out the technology with my students. I am comfortable with a high degree of uncertainty and do not feel the need to defend my integration of technology with my colleagues or administration.	3
Level 2: Early Adopter I am often asked for advice concerning technology integration from my colleagues. I am in a leadership role and/or have been asked to assist others in my school and/or district in implementing new technologies in the classroom. I may not be apt to adopting the newest technology, but I am respected, and my expertise is valued when I implement new technology.	9
Level 3: Early Majority I adopt the use of new technology before the average educator. I frequently interact with my peers, but do not necessarily hold a leadership position. I deliberate for some time prior to adopting a new technology. I don't want to be the first to adopt new technology, but I certainly do not want to be the last.	21
Level 4: Late Majority I will use technology in my classroom due to increasing pressures from my colleagues and/or administration. I am skeptical of	6

Self-reported Description	Number of Participants
new technology and do not adopt new technology until I know that it will work for me and my students in my classroom.	
Level 5: Laggard	15
I am comfortable with my current use of technology. I use what has always worked for me and my students. I will adopt a new technology only if I know it will not fail on me. Technology is always changing; I do not want to have to constantly relearn the newest fad.	

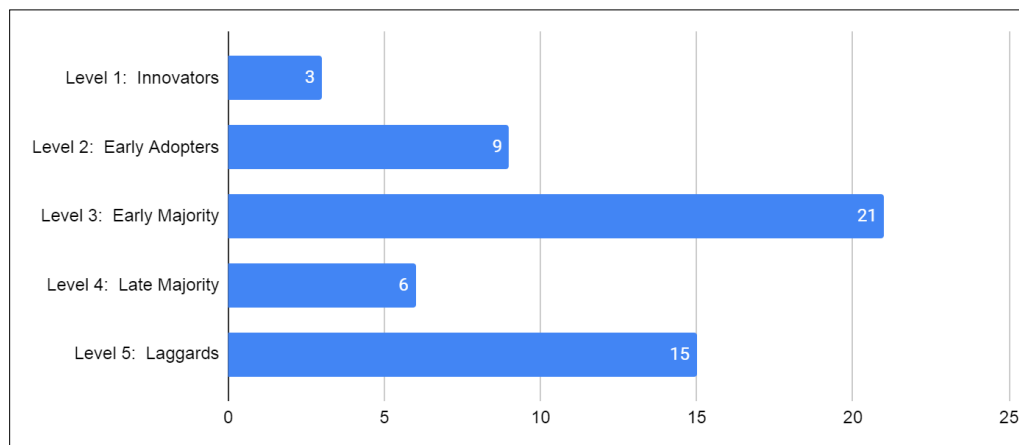


Figure 4.1. Diffusion of Innovation Graph. The number of each level of Diffusion of Innovation is depicted in the graph.

As a follow up to the descriptive statistics, a test was run to determine if participants at each level of Diffusion of Innovation were statistically different from the frequencies noted in Rogers (2001). A Chi-square goodness-of-fit test was conducted to compare the reported frequencies with the following proportions with Rogers' proportions expected within a system:

- 2.5% are Level 1: Innovators
- 13.5% are Level 2: Early Adopters
- 34% are Level 3: Early Majority
- 34% are Level 4: Late Majority

- 16% are Level 5: Laggards

Table 4.14 shows the observed and expected numbers of individuals at each level of Diffusion of Innovation. These frequencies were significantly different, $\chi^2(4, n = 54) = 19.20, p = .0007$. In three of the five levels, the observed frequency of participants shows a smaller variation. Level 1: Innovator observed percentage (5.5%) was close to the expected percentage (2.5%). Level 2: Early Adopter observed percentage (16.6%) was close to the expected percentage (13.5%). Level 3: Early Majority observed percentage (38.9%) was close to the expected percentage (34%). However, the last two levels were significantly different from the expected percentages based on Rogers (2001) diffusion of innovation levels. The Level 4: Late Majority observed percentage (11.1%) was much lower compared to the expected percentage (34%). The Level 5: Laggard observed percentage (28%) was much higher than the expected percentage (16%).

Table 4.14. *Frequencies and Percentages for Diffusion of Innovation Results (n = 54)*

Diffusion of Innovation Level	Observed	Observed %	Expected	Expected %
Level 1: Innovator	3	5.5%	1	2.5%
Level 2: Early Adopter	9	16.6%	7	13.5%
Level 3: Early Majority	21	38.9%	18	34%
Level 4: Late Majority	6	11.1%	18	34%
Level 5: Laggard	15	28%	8	16%

Table 4.15. *Frequencies for Diffusion of Innovation Results (n = 54)*

Diffusion of Innovation Level	Observed	Expected
Level 1: Innovator	3	1
Level 2: Early Adopter	9	7
Level 3: Early Majority	21	18
Level 4: Late Majority	6	18
Level 5: Laggard	15	8

Qualitative Data Analysis

Qualitative data were collected in the form of three teacher-focus group interviews and two administrator-focus group interviews at Lakeside High School in 2019. Each of the focus group interviews were semi-structured, open-ended discussions. Six assertions were developed to describe participants' experiences with educational technology integration and educational technology-focused professional development:

1. Current educational technology-focused professional development does not always meet the needs of all teachers to support educational technology integration in the classroom.
2. Teachers' technology integration is reflective of their willingness to participate in and seek out professional development, as well as previous experiences using technology in the classroom.
3. Administrators' perceptions of technology integration are reflective of observations of teachers' willingness to participate in professional development and technology integration in the classroom.
4. Teachers face difficulties when attempting to integrate technology in the classroom.
5. The support system for educational technology integration should remain, but educational technology-focused professional development needs to be structured to allow teachers to effectively plan and implement technology in the classroom.

6. School-level administrators want to provide more time, applicability, and differentiation into educational technology-focused professional development, but teachers need to be active participants.

The themes from the focus group interview data are described later in the chapter.

Qualitative Data Analysis

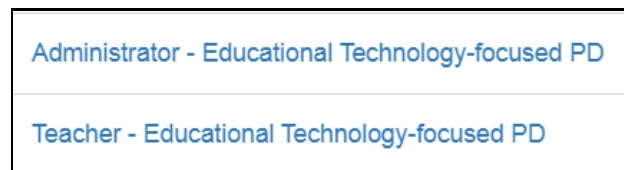
The qualitative data sources included three teacher-focus group interviews and two administrator-focus group interviews. Table 4.16 provides the abundance of this data set.

Table 4.16. *Summary of Qualitative Data Sources*

Types of Qualitative Data Sources	Number	Total Number of Codes Applied
Teacher-focus group interviews transcripts	3	254
Administrator-focus group interviews transcripts	2	182
Totals	5	436

Qualitative data, in the form of transcripts, were obtained and recorded using an audio recording device that saved recordings of focus group interviews in an .mp4 file. The .mp4 files were then transferred to my computer and then uploaded to the online transcribing application, Temi. Temi transcribed the .mp4 files and allowed me the opportunity to listen and edit the transcripts as needed. Next, I used the coding application, Delve, to upload my transcripts in order to code my qualitative data. There were a total of 436 codes applied in the first round of coding. After first round codes were created in Delve, I printed the codes to allow me the opportunity to group the codes according to their similarities during my second round of coding. This enabled me to identify patterns, which resulted in six themes. In this study, first round coding consisted of three techniques: structural coding, open coding, and in vivo coding.

Structural coding sets the foundation for successive coding strategies. It allows the researcher to categorize data relevant to specific research questions (MacQueen, McLellan-Lemal, Bartholow, & Milstein 2008). The research questions for this study revolve around the needs and preferences for educational technology-focused professional development from the perspective of teachers and administrators. Structural coding included separating all teacher-focus group interviews and administrator-focus group interviews (see Figure 4.2) in Delve. I made two distinct projects: a) Administrator - Educational Technology-focused PD and b) Teacher - Educational Technology-focused PD.



Administrator - Educational Technology-focused PD
Teacher - Educational Technology-focused PD

Figure 4.2. Structural codes in Delve.

The goal of solely answering research questions can cause a researcher to miss other possible interpretations of the data corpus. Open coding allows the researcher to break apart interview data, which leads to further examination and comparison of the data (Saldaña, 2016). Open coding is well-suited for line-by-line analysis of interview data in order to find relationships between codes (Saldaña, 2016). In this study, I incorporated terms or phrases as my open codes (see Figure 4.3). For example, one of my codes was “Difficulties Using Tech.” I also included a descriptor that further explained the first stem of the code. For example, two codes in “Difficulties Using Tech” included: “Difficulties Using Tech: Troubleshooting” and “Difficulties Using Tech: Downloading Updates.”

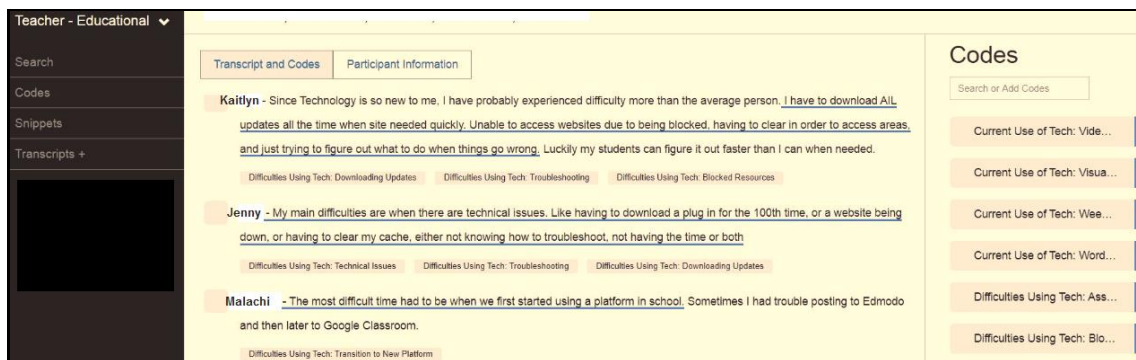


Figure 4.3. Open coding in Delve.

In vivo coding was utilized to pull codes from the participants' vocabulary, which honors the voices of the participants (Saldaña, 2016). In vivo coding also allows researchers to describe the meaning in what participants say to better convey their experiences in their own language (Stringer, 2014). In vivo coding involved selecting short phrases or quotes that described specific experiences that participants communicated during the focus group interviews. I placed the phrases in quotation marks to distinguish them from the open codes (see Figure 4.4). There was overlap between the open codes and in vivo codes.

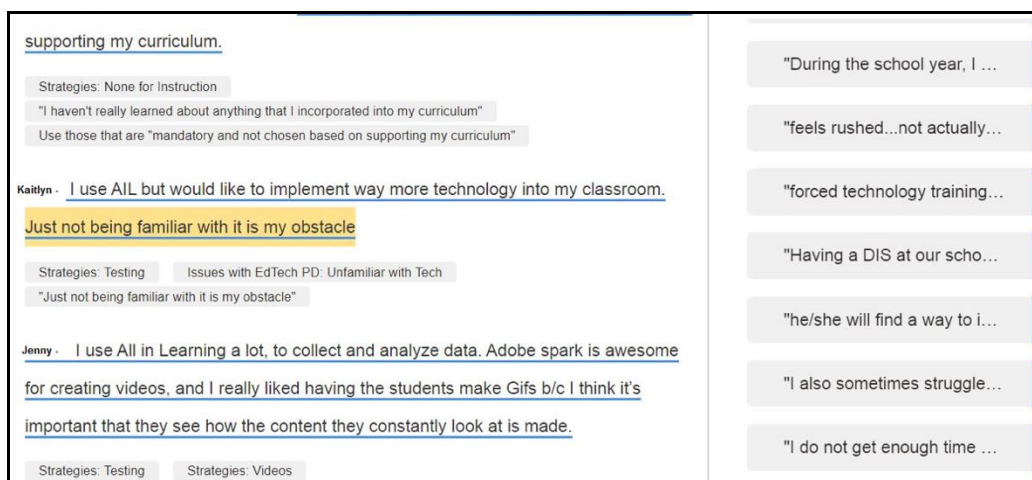
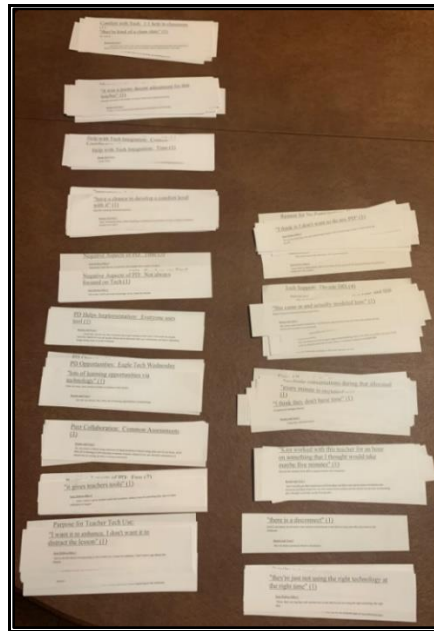


Figure 4.4. In vivo codes in Delve.

Second round coding consisted of identifying themes that emerged from the focus group interviews by utilizing pattern coding. Pattern coding allows for the large number of codes generated during the first round of coding to be condensed into major categories and themes (Miles, Huberman, & Saldaña, 2014; Saldaña, 2016). Iterative rounds of condensing data into categories and themes allowed me to examine the depth and quality of data from the focus group interviews.



*Figure 4.5. Administrator-focus
Groups' Categories on Paper.*

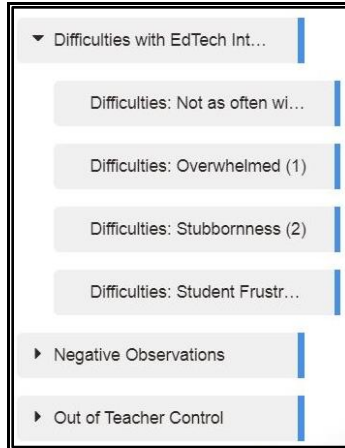


Figure 4.6. Administrator-focus Groups' Categories in Delve.

Following category creation in Delve, I organized the strips of paper on the table into themes. I used small sticky notes to title each them. I was able to reduce the categories into six themes (see Figure 4.7). Once the themes were organized, I used Delve to nest the categories into themes (see Figure 4.8).

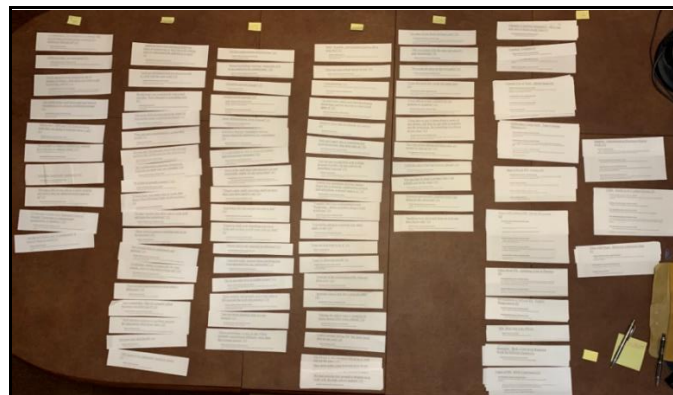


Figure 4.7. Categories on Paper. Categories from teacher- and administrator-group interviews organized into six themes.

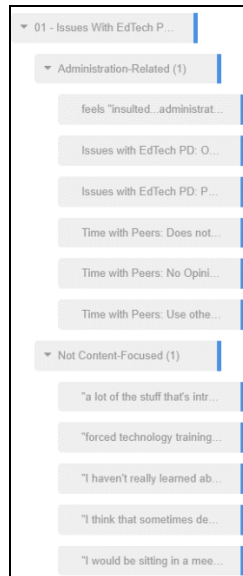


Figure 4.8. Portion of the First Theme in Delve.

Furthermore, while first- and second-round coding were occurring, several peer debriefing sessions took place with my dissertation chair. During these sessions, codes, categories, and themes were analyzed and reviewed for clarification while in Delve. Based on the peer debrief sessions and as analysis of the qualitative data progressed, some codes and categories were rearranged for better alignment with the overall themes.

There were a total of six themes with multiple categories in each theme that emerged from the codes. The themes include: (a) current educational technology-focused professional development does not always meet the needs of all teachers to support educational technology integration in the classroom, (b) teachers' technology integration is reflective of their willingness to participate in and seek out professional development, as well as previous experiences using technology in the classroom, (c) administrators' perceptions of technology integration are reflective of observations of teachers' willingness to participate in professional development and technology

integration in the classroom, (d) teachers face difficulties when attempting to integrate technology in the classroom, (e) the support system for educational technology integration should remain, but educational technology-focused professional development needs to be structured to allow teachers to effectively plan and implement technology in the classroom, and (f) school-level administrators want to provide more time, applicability, and differentiation into educational technology-focused professional development, but teachers need to be active participants.

In order to confirm the accuracy of my themes I employed member checking. “Member checking is a process of asking participants who were directly involved in the study to review the accuracy of the research report” (Mertler, 2017). As a part of my member checking process, I sent multiple emails to each participant. Each email explained one theme with all relating categories (see Figure 4.9). Administrator-participants were asked to check Themes 1, 3, 4, and 6. Teacher-participants were asked to check Themes 1, 2, 4, and 5. As seen in Figure 4.10, participants offered affirmation and tips for clarification of the wording of themes. Member checking enabled to me to describe the experience of my participants.

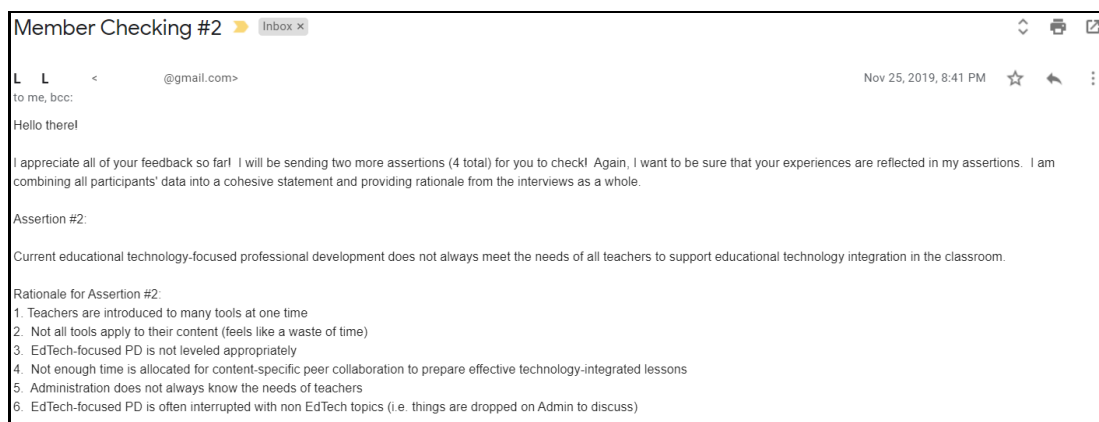


Figure 4.9. Email to Participants for Member Checking.

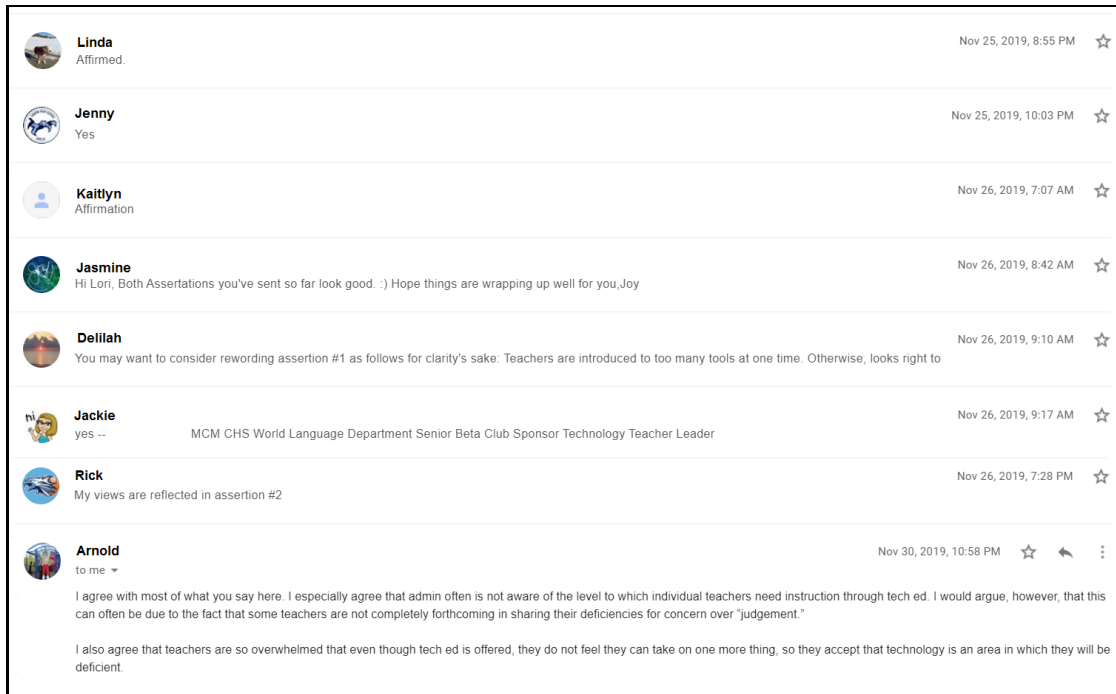


Figure 4.10. Responses from Participants for Member Checking.

Qualitative Findings

Qualitative findings were obtained from five focus group interviews. Three focus group interviews were with teachers while two focus group interviews were with administrators. Pseudonyms were used to maintain the anonymity of each participant. Verbatim quotes are used throughout the themes to reflect participants' perceptions and ensure authenticity. Six primary themes emerged from the analysis of the data (see Table 4.17). These themes describe the teachers' preferences and needs, as well as, the administrators' perceptions of teachers' preferences and needs for educational technology-focused professional development.

Table 4.17. *Themes that Emerged from Qualitative Data*

Themes	Categories
1. Teacher technology integration reflects their willingness to participate in PD and previous experiences.	<ul style="list-style-type: none"> Teachers' perceptions: <ul style="list-style-type: none"> Current technology integration Comfort with technology Varied types of professional development
2. Teachers need support and structure to integrate technology.	<ul style="list-style-type: none"> Teachers' perceptions: <ul style="list-style-type: none"> Current positive aspects Structural changes are needed
3. Administrators' perceptions of teachers reflect observations of teachers during PD and in the classroom.	<ul style="list-style-type: none"> Administrators' perceptions: <ul style="list-style-type: none"> Visions for teachers' technology integration Observations of teachers
4. Administrators want to support teachers' technology integration with teachers' participation.	<ul style="list-style-type: none"> Administrators' perceptions: <ul style="list-style-type: none"> Structural changes are needed Teacher-focused aspects
5. Current EdTech PD does not meet the needs of teachers.	<ul style="list-style-type: none"> Corroborating perceptions: <ul style="list-style-type: none"> Too many tools Lack of applicability Lack of differentiation Lack of content-specific collaboration Administrators' perceptions: <ul style="list-style-type: none"> Disconnect from teacher needs Interruptions during PD
6. Teachers face difficulties when integrating technology.	<ul style="list-style-type: none"> Corroborating perceptions: <ul style="list-style-type: none"> Technology integration can be overwhelming Student issues Technical issues

Theme: Teachers' technology integration is reflective of their willingness to participate in and seek out professional development, as well as previous experiences using technology in the classroom.

This theme was developed from teacher-focus group interviews and is reflective of the experiences of teacher-participants as they explain their willingness to seek out and participate in educational technology-focused professional development and their

experiences with utilizing technology with students in the classroom. This theme explores the relationship between technology integration in the classroom as it relates to professional development.

In this study, teachers' willingness to participate in and seek out professional development ranges from attending only mandatory school- or district-based educational technology-focused professional development to completing graduate-level coursework and attending technology-focused conferences. There are multiple ways teachers can participate in educational-technology professional development. District- or school-based professional development (Guskey & Yoon, 2009; Latif, 2017), EdCamps (Carpenter, 2016; Carpenter & Linton, 2016), professional learning communities (Jones & Dexter, 2014; Peppers, 2015; Stanley, 2011), massive open online courses (Misra, 2018; Tossell et al., 2015), and coaching (Desimone & Pak, 2017; Ertmer & Ottenbreit-Leftwich, 2010; ISTE, 2020) are just a few of the ways that teachers can participate in professional development to enhance their technology skills. In this study, most of the teachers participated in school- or district-based professional development and graduate-level courses. There was one teacher who attended conferences and participated in webinars to meet her needs.

This theme encompasses three categories: a) teachers' current use of educational technology as defined by their diffusion of innovation (Rogers, 2001), b) comfort level when working with technology in the classroom, and c) participation in educational technology-focused professional development. These categories will be described in detail.

Teachers' current use of educational technology. In this study, this category reflects how teachers incorporate educational technology in the classroom. This category helps explain reasons why teachers currently use educational technology. This category describes how teachers currently use technology, regardless of professional development. While the 2018 Global Education Census Report from Cambridge Assessment International Education cites that the United States has the highest use of desktops (75%), SmartBoards (59%), and smartphones (74%) in the world, the participants in this study do not all use technology in their classrooms. Although our district has transitioned to one-to-one devices (i.e. Chromebooks), not all teachers in the school use them. All classrooms in the school have a SmartBoard, but they are not all used for interactive lessons.

In this study, teachers use technology in the classroom in a multitude of ways: digital grade book, student monitoring, student assessments, content review, GAFE and other Google extensions, communication, online activities, and teacher-led instruction. The number of tools used by the teacher-participants varies depending on the individual's preference. Rogers (2001) discussed the diffusion of innovation of technology in terms of an individual's decision to use an innovation. In this study, some use technology tools for grade books and attendance mandates, while others seek new opportunities to enhance student-centered learning with technology.

Donna noted that she has not incorporated many technology tools into her classroom except "those [that] are mandatory and not chosen based on supporting my curriculum." This teacher is, more than likely, a laggard in terms of technology adoption (Rogers, 2001). Her students have been successful on high-stakes national assessments

with her current instructional strategies. She wants to be sure that a new technology tool will not fail before she adopts it with her students. Multiple teachers added that they used the district-purchased online assessment system to assess student learning and keep track of student growth in content-based meetings as mandated by the district. Most teacher-participants utilize Google Classroom to communicate information and assignments to parents and teachers. Jenny said, “I realized recently how dependent I am on Google Classroom to communicate assignments to students.” Malachi also discussed how he used Google Classroom:

I have mostly been using technology through Google Classroom. I assign English papers and projects through Google Classroom as Docs and usually include links to additional resources. In my journalism classes, I use [Google] Classroom to hold news quiz links to the *NY Times* and as a way for students to view news clips and post their responses, either to me or to the class.

These teachers could be considered the early majority of teachers because they use technology before the average educator but deliberate for some time prior to adopting new technology (Rogers, 2001). Google Classroom has been available in the district for a few years. These teachers are comfortable with utilizing it because they know it will work for their purposes.

In this study, there are a few teachers who would be considered innovators or early adopters by first using technology tools and serving as change agents in the school (Rogers, 2001). For example, Jasmine stated:

I had them create gallery walks with our most recent project where they actually had to put their artwork up in a video format and talk about each one and then share it [with] the class on Google Classroom through a question.

Similarly, Stacy said, “My AP kids create themed Weebly sites they build upon all year and my E3 [English III] kids build expert sites where they explore one topic.” These teachers utilize technology to have students create portfolios and videos for gallery walks and student discourse or use technology tools that have not had as much exposure in the classroom setting. In this study, there is a wide range of technology integration in the classroom, which is important to note when describing teacher-participants’ current use of educational technology in the classroom.

Comfort level when working with technology in the classroom. In this study, comfort level is defined as a teachers’ comfort when utilizing educational technology with students for the purposes of learning. Previous research has found that when teachers are unsure of how to effectively integrate technology, they have a low comfort level (Hechter & Vermette, 2013). It relates to other categories in this theme because it evaluates experiences teachers have had when they use technology in the classroom. This category is distinguished from other categories because it describes the various attitudes teachers have when they integrate technology in lessons due to previous experiences

Previous researchers found that technology integration was negatively influenced by the number of years teaching, while integration was positively influenced when teachers had experience with utilizing technology (Inan & Lowther, 2010; Liu, Ritzhaupt, Dawson, & Barron, 2017). The findings of this study are slightly different because newer

teachers were not necessarily more comfortable utilizing technology in the classroom. For example, Kaitlyn is a new teacher, but this is also her second career. Therefore, she is older than most teachers with the same number of years of experience. Although she is a new teacher, she does not always feel comfortable using technology in the classroom. However, previous research (Liu et al., 2017) also corroborates the findings in this study because teachers who have practice with using technology in the classroom feel more comfortable using technology in the classroom.

In this study, teacher-participants described their comfort level depended on the type of technology and the amount of practice using the technology. For example, Delilah said, “it’s not that the PD [professional development] was or was not helpful. It was the fact that we didn’t have time to really get into it.” If she learns about a tool in professional development that she finds useful, she will try to figure it out on her own if she has the time to do so. Linda shared similar experiences with professional development when she stated, “[I] usually feel as though I know enough to get started but learn much of it on my own.” These teachers acknowledge that they learn enough to get started using technology but have to spend much of their own time to really feel comfortable using the technology. If teachers are unable to spend much of their own time to practice using the technology on their own, they may not feel comfortable enough to use it with their students.

Jackie said, “I gain additional insight and practice each time [attending professional development]. For me, practice and implementation does make a difference.” Similarly, Donna stated, “If I use specific technologies, I spend the time

necessary to learn them.” In this study, teachers have to spend time inside and outside of professional development to become comfortable with technology tools.

A few teachers also noted that their students were great resources for learning how to use technology tools. Jenny stated, “I can usually take something I’ve learned and use it that day. If there’s something that I don’t quite know, I can usually figure it out with the kids.” Not all teachers are familiar with technology and lean on the ability of students for technology integration. Kaitlyn said she feels “ok, once I use that particular technology, I can catch on and feel comfortable with it ... my students can usually figure it out way faster than I can - I rely on them a lot sometimes.” She is comfortable with the fact that her students are digital natives and have the knowledge to help her with technology that she has not used. Likewise, Stacy said that students were a “great resource” and that she is not afraid to mess up in front of them. Whereas these two teachers are comfortable soliciting students to help them with technology integration, not all teachers feel comfortable if they require students’ help. Learning through professional development helps teachers feel comfortable using technology tools in the classroom.

Participation in educational technology-focused professional development. In this study, this category describes the types of educational technology-focused professional development teachers participate in to learn more about using technology tools. This relates to other categories in this theme because it explores teachers’ willingness to seek out and participate in educational technology-focused professional development. This category is distinguishable from the other categories because it specifically relates to their current professional development routines.

Technological, pedagogy, and content knowledge domains require teachers to seek further understanding, through professional development, in order to learn how different types of technology are appropriate for their teaching style and subject matter (Koehler & Mishra, 2009). In this study, there is a range in the amount and type of professional development that teachers participate in for educational technology. Some teachers describe how they have only participated in educational technology professional development when required while some attend outside of school and district requirements. This study corroborates the findings of the adult learning theory because many teachers in this study learn information when they are ready to learn or find it useful (Cox, 2015; Knowles, 1978).

Sadie noted that being a new mom prohibits her from having the time to attend professional development outside of what is required and offered at school. Her reason is quite different from other teacher-participants. For example, Rick had very strong opinions on attending professional development:

I do not like professional development 99% of the time There is often some speaker [who] tells you how to teach, sometimes they are insulting, or it is something that administrators desperately need to fill a slot to show we are being 'developed'.

Rick does not integrate technology in his classes except to show videos or presentations. Delilah remarked that “if our district were to spend as much time having us learn one piece of technology as they did with making sure we understand the definition of rigor Then maybe we could use that piece of technology.” She was commenting that she, and other faculty members, felt insulted during a few professional

development sessions led by district office employees. For a few of these participants, the manner in which professional development is presented to teachers can lead to ill-feelings toward educational technology-focused professional development and technology integration in the classroom.

On the other end of the spectrum, some teachers participate in educational technology-focused professional development because they enjoy it or want to learn how to more effectively integrate technology in their classrooms. Stacy described her experience with educational technology-focused professional development when she said her “Master’s +30 is in technology, so I took courses from a variety of places.” Those places included graduate-level courses offered by the district one night a week for a semester. This has been the case for multiple teacher-participants. Jasmine said, “I took three of them [graduate-level courses] and they were fantastic it was not a good idea [to take three classes in one semester] but it was absolutely fantastic.” She described how the classes helped her create units of study for her students, which made the courses applicable to her content-area. Similarly, Nora said that she seeks out as much educational technology-focused professional development as possible:

So, I've done, um, something called Simple K12 and that's like little webinars that are on and they're all free. Um, well there's some that are paid for, but a lot of them are free on Saturday morning and then you can just listen to, or you can listen and watch. Um, but they're, they have all the topics of the world, of any kind of Google stuff. Um, it's just any tech you want. They have and I've used that, and I've gone to ISTE and that was really interesting to go to that conference.

That was really neat. Um, but yeah, I'm and I've done a lot of the classes [be]cause I'm kind of a junkie. I love classes. I love those kind[s] of things. Depending on the amount of time available and their willingness to seek out educational technology-focused professional development, teachers may or may not be able to effectively incorporate technology in their classrooms.

Summary. The first theme explained the variation in the willingness of teachers to participate in and seek out professional development. It also described previous experiences teachers had when attempting to utilize technology in the classroom. This theme conveyed teachers' current use of educational technology, the comfort level when working with technology in the classroom, and teacher participation in educational technology-focused professional development. Furthermore, this theme provides a foundation for where the teachers are in their current involvement with educational technology-focused professional development.

Theme: The support system for educational technology integration should remain, but educational technology-focused professional development needs to be structured to allow teachers to effectively plan and implement technology in the classroom.

This theme reflects the preferences of the teacher-participants in this study. There were a few aspects of educational technology-focused professional development that are in place that teachers appreciate; however, the teachers in this study explained that they would like to have other specific components incorporated into the overall plan for educational technology-focused professional development. As teachers feel more comfortable that their needs are met, they can have greater self-efficacy. Researchers have found that when teacher self-efficacy increases, so does their effective

implementation of effective technology integration in their classroom (Delgado, 2018; DeSantis, 2012; Ertmer & Ottenbreit-Leftwich, 2010). In each teacher-focus group interview, many of the comments from participants included how they envisioned effective educational technology-focused professional development that could increase their self-efficacy with technology integration. This theme subsumes multiple categories: (a) current effective aspects, (b) teacher preferences for structure, and (c) teacher preferences for tools. This theme reflects teachers' preferences and needs for educational technology-focused professional development rather than describing how the current system does not meet their needs.

Current effective aspects. This category entails the current effective aspects of educational technology-focused professional development and support, as indicated by the teacher-participants. This theme sets the foundation of what characteristics teachers prefer as a part of the educational technology-focused professional development and integration; however, it describes those characteristics that are already in place, rather than what is lacking from the current professional development plan. Currently, the district and school try to incorporate ISTE-A standards by allocating time and resources for teacher professional development and ensuring that all teachers and students have access to the tools and resources they need (ISTE, 2009).

There are two aspects of educational technology-focused professional development that teachers expressed should continue: (a) offering a consistent platform and (b) maintaining a school-based technology staff.

Offering a consistent platform. Teachers in this study explained that they appreciate that educational technology-focused professional development sessions often

focus on GAFE. In our discussion of comfort using educational technology, teachers described that the district previously seemed to encourage the use of new technology tools for the sake of using the newest programs (e.g., Edmodo followed by Google Classroom, online testing program, etc.). The district has been using GAFE as the consistent platform for communication (via Gmail and Google Classroom) and workflow (i.e., Google Docs, Google Slides, Google Forms, other Google Apps, etc.) for the past few years. Nora noted that there was an inconsistency with teachers using Google Classroom. For example, she said, “You’ve got some die-hard Google Classroom people and then you’ve got some, okay, ‘I’m touching it but I’m not sure if I like it.’ And then you have the, ‘I’m not using it at all.’” She is a special education teacher and has the opportunity to work with many different regular education teachers to assist her students. However, in the conversation Jasmine shared, “at least everybody in the district has access to it.” Jasmine pointed out that the district has encouraged teachers to use a common platform, Google Classroom, to use in their classroom. When Google Classroom was initially released by the district, teachers were given the opportunity to take part in professional development related to the new online platform. Teachers appreciate that the district has invested in a consistent platform that is available to everyone at every school.

Maintaining a school-based technology staff. Each of the high schools in the district has multiple staff members on a school-based technology team. The team includes a digital integration specialist (DIS), an information systems resource technician (ISRT), and several technology teacher leaders (TTLs). The DIS oversees school-based professional development, is the liaison between the district-level technology staff and

the school, ensures all students are using their district-issued Chromebook appropriately, and assists teachers as needed with technology tools. The ISRT is responsible for the upkeep of the hardware in the school, as well as installing programs onto all district-owned devices and works directly with the DIS to troubleshoot issues with technology tools and devices. The TTLs support the DIS in assisting and/or leading educational technology-focused professional development sessions and helping teachers with troubleshooting.

Multiple teachers in all of the focus group interviews described how the school-based technology staff had a positive impact on technology integration because they conducted short professional development sessions to introduce new technology tools. School-based technology staff also encouraged teachers to seek help when they have trouble incorporating new tools. Kaitlin said, “The technology team has been a huge support to me. [It] seems they [the technology team] always drop what they are doing to help me when I call.” Jenny also noted that having the technology team “at our school is really helpful and shows that our administration supports us.” Teachers recognize the value that the technology team has when it comes to technology support and integration.

Teachers also explained that the DIS structures educational technology-focused professional development sessions as best as she can with the time she is given. When teachers require her assistance outside of the professional development session, the DIS helps teachers during their planning or during class time. Rick said, “[Carla, our school’s DIS] is a Godsend to a person like myself that [who] sees technology as more of a hindrance than an aid.” Similarly, Delilah said, “It’s nice to be able to teach and teach

the instruction while she [Carla] goes around and handles the technology.” Delilah also added that Carla was helpful by saving the English department time when she set up assessment items on a newly purchased online assessment website. Delilah said, “You pull, like, whole chunks of material and we needed it standards-based and we just, it wasn’t that we didn’t know how to use the technology, we just didn’t have the hours to put into it.” Carla offered to organize the assessment items by standards for the department. Sadie agreed that Carla is a valuable resource:

She’s pretty good too, about saying, like, you know, ‘I can stay here and help you get started with the kids.’ If it’s something new that you’re, or at least just using an extra hand. Especially as a program the kids have never used before. Like, it’s really hard to put out, you know, 25 fires by yourself when they don’t know how to do it. So, it’s nice when she comes in and helps.

The technology team, especially the DIS, plays an integral role in assisting teachers implement various technology tools with their students. There are multiple examples from the teacher interviews that described the work of the DIS. The teachers expressed that she supports and troubleshoots for teachers when they integrate technology in their classroom. She, along with the other members of the technology team, assists teachers during initial and continuing educational technology-focused professional development sessions, supports teachers during their planning for technology integration, and provides a helping hand with students.

Teacher preferences for structure. In this study, teacher-participants described how educational technology-focused professional development should be structured long-term and during actual sessions. This category describes teachers needs and preferences

for educational technology-focused professional development; however, it focuses on the organization of the professional development sessions. The Eiffel Project identified “modeling, discussion, brainstorming, hands-on activities, and just in-time support” as key characteristics of professional development (Mouza, 2002). Similarly, Garet et. al. (2001) posit that professional development should be content-focused, include active learning, and be integrated within the day-to-day operations of the school. These characteristics coincided with two of the suggestions made by the teachers in this study, modeling and offering more practice time during sessions.

Teachers in the focus group interviews identified seven characteristics that would make educational technology-focused professional development more effective. The seven characteristics include (a) modeling, (b) content-related grouping, (c) differentiated grouping, (d) organizing sessions that are solely technology-focused, (e) sharing practical tools, (f) providing the option for self-paced professional development, and (g) offering more practice time during sessions.

Modeling. Although the word *modeling* was not used very often during the teacher-focus group interviews, the teacher-participants mentioned that facilitators should show them how to use technology tools during professional development sessions. Jasmine described how she was taking three graduate-level technology courses at one time. She noted that the facilitator “used it [multiple technology tools] within the class...totally modeled how we would then use it in our own classrooms.” Malachi described that he likes to practice “after we’re shown how to do it and given some ideas.” The participants also described that facilitators introduced them to certain technology tools. Linda said that she wanted to learn how to use technology tools in a way that

allows her to “be the student.” Teachers in this study explained that modeling provides them with ideas for including technology-based instructional strategies in their lessons.

Content-related grouping. Teachers in all three of the teacher-focus group interviews discussed the need for content-related grouping for educational technology-focused professional development. Content-related grouping is when teachers who teach similar content (i.e. biology, geometry, photography, etc.) the ability to form a group to develop lessons that integrate technology (Garet et al., 2001). Kaitlyn said, “An ideal PD day would be to learn about the technology for my particular subject, working with others who teach the same subject, and then developing [lessons that incorporate] technology and having time to learn it and apply it.” Stacy also described that “content-based learning where tools are introduced, and we are given time to work with the new tools in our data or shared course teams.” Teachers explained that working with other teachers who teach the same subject allows them to brainstorm to develop lesson plans that incorporate technology to enhance student learning.

Differentiated grouping. Another characteristic that teachers in this study discussed in all three teacher-focus group interviews was the preference for differentiated grouping in professional development sessions. Differentiated grouping refers to grouping teachers based on ability levels. Research indicates that experience with technology integration and age play a role in the ability of teachers to utilize technology in the classroom (Fenton, 2017). Jackie suggested that educational technology-focused professional development sessions should be “well-labeled...so teachers can join the appropriate skill-level class.” Sadie also identified that it is not only the ability to work

with certain types of technology, but “some differentiation would be nice because she [another teacher of a different subject] might not need what I need.”

The conversation during one focus group interview started to transition into the school’s Wednesday morning technology professional development sessions. These sessions occur one time per month for approximately 45 minutes to one hour. There is only enough time to show new technology tools or provide quick work sessions for teachers to practice with technology tools. Delilah explained both concepts in one statement.

One of the things that I don’t like about the Wednesday morning sessions is that it’s...based on the piece of technology, which isn’t bad at all, but then you’ll have all variety of disciplines and you’ll have all the variety of, of comfort levels. Delilah explained that most Wednesday morning sessions are focused on specific technology tools and are not differentiated to meet the needs of all teachers’ ability levels or content. After her comment, multiple teachers said that the sessions should offer more differentiation for the various ability levels with more focus based on content-related tools.

Organizing sessions that are solely technology focused. Only one teacher-focus group interview specifically described the Wednesday morning technology professional development sessions. They described that they prefer sessions that solely focus on technology integration. For each teacher, the organization was a bit different. For example, Nora suggested that teachers should be provided with “four Wednesday sessions in a row and then nothing else in the Wednesday morning [sessions].” She went on to emphasize that there should not be “five other thousand things that I’m supposed to

do” in these sessions where there are other things that are not related to technology integration. In this particular case, she was incorporating a few issues with Wednesday morning technology sessions. One issue is that they are very short and occur only once per month for 45 minutes to an hour. Sadie followed Nora’s comment when she said, “Adobe Spark is my thing [to focus on] the whole year. Every Wednesday we talk about it, reflect about it. Like, I’m doing this [learning about Adobe Spark] for real.” Sadie was describing how professional development sessions, especially on the short Wednesday morning sessions, are not solely focused on technology. The other issue is that the technology sessions, even though they are short, are interrupted with other topics that are not technology-focused (e.g., data team meetings, issues with student behavior, quick announcements from the school counseling office or district office, etc.).

Sharing practical tools. In this study, practical tools are those tools that can be used by teachers for immediate use in their classrooms. For example, Jenny stated that she likes “having time to make a product that I can actually use in my class.” Jasmine also described how her three graduate-level educational technology courses overlapped. While she spoke about talking to the facilitators of each class, she stated, “I promised I will put in the work of three projects, but I’m going to do it all on the same topic so that I just, like, built this whole, like, giant unit.” For her, the practicality of the classes allowed her to build one large unit, based on her content, that she incorporated into her art class. The three projects had more practical value to her because she created something that she actually used with her students. The teacher-participants explained that they want educational technology-focused professional development to be practical so that they can implement the strategies in their classrooms.

Malachi had a similar experience in a shorter educational technology-focused professional development session. He shared, “After hearing about hyperdocs, I was able to create a project for the students to complete, as the hyperdoc walked them through the different parts of the project they needed to include.” Malachi had a practical use for the tool he was introduced to during professional development, and he expressed that he had time during the session to produce a lesson to use with his students. Similarly, Delilah described that she preferred professional development sessions that enabled her to incorporate technology into lessons that she already uses in her classes. Delilah stated, “Let me go ahead and work it into an already existing unit, or lesson, or whatever.” Teachers in this study preferred educational technology-focused professional development to be practical for them to incorporate them into their classes.

Providing the option for self-paced professional development. Not all teachers in this study preferred face-to-face professional development sessions. Jenny noted that she preferred when Carla “sent out the PD over email with the links and step-by-step instructions.” This allowed her the opportunity to complete the professional development when she had the time, energy, and focus available to practice with the technology tools. Jenny also described that she often loses focus during whole-group sessions. She suggested that self-paced professional development also enabled teachers to have directions to refer back to if they missed an important step.

Offering more practice time during sessions. Teachers in this study overwhelmingly described the need for more time to work with the technology tools that were presented in educational technology-focused professional development. While many teachers described the need for more time with content-specific peers, the majority

of teachers also indicated that time to practice using the technology was key for effective implementation. Donna stated, “I would rather have longer sessions that allow me to work with and learn the technology.” Linda also described that “more time to practice and plan and set up the sessions [lessons]” would be helpful. Although Jackie is a TTL, she explained that “practice and implementation does make a difference.” When teachers are provided with time to explore how to use the technology tools they are introduced to during educational technology-focused professional development they can determine if the tool would be applicable to their content. However, teachers emphasized that time to explore technology tools is not always embedded in educational technology-focused professional development sessions.

Delilah explained that after she has learned about multiple technology tools, she likes that she prefers when a facilitator “then gives you time to get in and play with it.” Malachi described a similar preference when he stated, “After we’re shown how to do it and given some ideas, it is best to actually practice.” It is after teachers are given the opportunity to practice with new technology tools that they can choose if the tools can be incorporated into their classroom.

Teacher preferences for tools. Similar to the findings of Liao, Ottenbreit-Leftwich, Karlin, Glazewski, and Brush (2017), teacher-participants explained that teacher preferences should be taken into consideration when planning for educational technology-focused professional development. Two aspects of teacher preferences were discussed: a) allowing for teacher choice and (b) investing in the paid versions of programs.

Allowing for teacher choice. In this study, teacher choice encompasses various aspects of learning about tools that teachers are interested in using in the classroom. Some teachers in this study described how they want the ability to select the educational technology-focused professional development sessions based on their own needs. For example, during a discussion about an ideal professional development session, teachers described they preferred to choose between several options. Jasmine stated, “I like the idea of having several options Sign up for one thing a month and that will be what your focus is.” In a different teacher-focus group interview, Jackie said that she liked “a variety of offerings.” Jackie also described that session options have explicit descriptions so that teachers know exactly what they need to sign up for during professional development.

Investing in the paid versions of programs. Teacher-participants also described professional development facilitators present tools during sessions that are not free. The version that teachers are presented with have the premium tools, or teachers may be introduced to the free versions, but they are limited in the ways they can be used for student learning. Teachers in this study did not want to pay for the premium versions. During a discussion about the difficulties that teachers face when using technology, Delilah explained how she feels when she uses tools that have free and premium versions:

There are a lot of really good things out there that we’re introduced to, but we’re introduced to the free version, and you’re like, okay, ‘Well this is all right; I like this.’ And then you get into it and you get into it, maybe, with the kids and all of a sudden, it’s like, oh, well, you know, for 99 cents more.

Delilah found that when she used free versions of online applications that she had to pay in order to use some of the features that she found useful. Teachers recognize that there are useful applications that cost money to access the premium version. Stacy said, “I would like the school or district to invest in some of the programs we use for free.” District- or school-purchased premium programs can be a basis for educational technology-focused professional development sessions.

Summary. The second theme is reflective of the needs and preferences of teachers for educational technology-professional development at Lakeside High School. The teachers in this study are appreciative of the district utilizing a consistent platform and supporting technology integration with a strong school-based technology staff. However, they would also like to have their preferences for structuring professional development and technology tools to be heard.

Theme: Administrators' perceptions of teachers' technology integration are reflective of observations of teachers' willingness to participate in professional development and technology integration in the classroom.

This theme was developed from administrator-focus group interviews. In this study, this theme is reflective of observations administrators have made when teachers are in professional development sessions or when they are using technology with students. Administrators in this study shared how they envision teachers' use of technology as well. This theme is distinguishable from other themes because it represents administrators' experiences as they have observed teachers, both in professional development and in the classroom. In a study of principals in the Netherlands, participants indicated that teachers' attitudes during professional

development impacts the overall effectiveness of professional development (Gaikhorst, März, du Pré, Geijssels, 2019). The findings of the study regarding teacher attitudes during professional development is reflected by the administrator-participants in this study. The administrator-participants descriptions of (a) how they envision teachers using technology in the classroom and (b) observations of teachers during educational technology-focused professional development and using technology as a teaching tool are described.

Vision for teacher-technology use. The first category in this study, recounts administrators' descriptions of how they envision technology tools used by teachers. This category relates to the other category in this theme because it encompasses administrators' descriptions of how teachers should use technology. It is distinguished from the other category in this theme because it is not necessarily taking into consideration the observations they have made of teachers. This category describes how they would like to see technology used by teachers. Lisa stated that she envisioned technology should "make their work smarter, not harder." This aligns with the International Society for Technology in Education - Administrator (ISTE-A) standards (2009) that call for administrators to ensure that technology effectively infused in all areas of the school. This category includes three subcategories: (a) communication, (b) enhancement of instruction, and (c) customization of instruction which are described below.

Communication. Communication is defined by relaying information to parents, faculty and staff, and students through digital means. This relates to the other subcategories within this category because it is one aspect of administrators' vision for

teacher-technology use. In this study, the school and district are on-board with GAFE.

They appreciate the functionality of GAFE. Beverly said:

I like to see them using a platform like Google Classroom so that it's easy for me, as the administrator for instruction, and being able to see actually, you know, what students have access to when students are not in school, homebound situations, um, that, you know, students can put their hands on what's actually happening in real time in the classroom. Um, and also for parents to see that you know what's going on in the classroom.

Beverly also mentioned that she encourages teachers to use Google Docs and Google Sites as a platform to allow students and parents the opportunity to know what is happening in the classroom. Arnold also said, “I would definitely say, even at the most basic level of teachers that don’t have an in-depth understanding of technology, [should] use it [email] for communication.” Administrators explained that teachers should definitely use technology as a means to communicate with students, parents, and administrators.

Enhancement of instruction. This subcategory describes how administrators want technology to be incorporated into instructional practices in an appropriate manner. This relates to the category because it reflects administrators’ vision for teachers use of technology in the classroom. It is distinguished from the other subcategories because it describes how administrators are cautious when it comes to technology integration in classrooms.

Mitchell describes that his “fear is always, though, that teachers try to use technology in places that they don’t need it. Just to say that they’re incorporating it, but I

want it to, I want it to enhance, I don't want it to detract from the lessons." Beverly also said, "there's lots of ways to integrate technology into teaching and learning, but I also think that, um, nothing takes the place of a good teacher." Administrators envision technology integration as a means to support the teachers, not as a tool to take their place in the classroom.

Customization of instruction. Customization of instruction is defined by making instruction differentiated through technology integration. This relates to this category because it is how administrators envision teachers using technology for instructional purposes. It is distinguished from the other subcategories because it relates to teachers planning instruction that is differentiated to meet the needs of all students in the classroom.

In this study, teachers are placed on data teams to plan instruction and monitor student growth. Mitchell said that teachers should use technology for data collection purposes. This allows teachers to plan accordingly, based on performance levels of each of their students prior to the start of a unit of study. The district uses an online assessment program that data teams can use to collect preassessment and postassessment data. The teachers can use the preassessment data to inform their instructional strategies. They can use postassessment data to determine, before a summative assessment, whether students have hit growth targets.

Lisa described how she envisions teachers to "add that customizing instruction to help intrigue students and kind of captivate, motivate kids." Beverly also stated, "teaching those research skills and, um, being able to have access to research and data and online information." In this study, administrators want technology to allow for

customization of instruction through data teaming, motivating students, and providing students the ability to research topics that interest them.

Observations of teachers during educational technology-focused professional development and while using technology as a teaching tool. This category describes how administrators perceive teachers' technology integration based on observing them. In this study, administrators recounted their experiences while observing teachers during educational technology-focused professional development and in the classroom. This category reflects how administrators have developed their own perceptions of teacher technology use. There are few findings that report administrators' observations or perceptions of teachers while teachers are in professional development sessions or utilizing technology in the classroom. However, there are contrasting findings in the literature related to teacher experiences. Previous research indicates that teachers "felt that the professional development that was offered within their district was not designed with an awareness of the educator needs and abilities" (Correia, 2016, p. 160). Administrators perceptions and observations of teachers during professional development and in the classroom may be reflective of the teachers' experiences during professional development in the classroom. This category includes descriptions of negative and positive observations of teachers during educational technology-focused professional development and classroom technology integration.

Negative observations. This subcategory encompasses observations of teachers while in educational technology-focused professional development that are not favorable. In this study, administrators described that some teachers, especially veteran teachers, do not come to professional development sessions with a positive attitude. Lisa

explained her perception of some teachers who come to school- or district-required professional development to “jump through the hoop and just sit here for an hour and then I’m going to go [on] my merry way.” In each administrator-focus group interview, participants described some teachers are simply present because they have to attend. Multiple administrators observed teachers who grade papers and check email while they are supposed to be participating in professional development.

While many teachers come to educational technology-focused professional development ready to learn, some teachers are not so enthusiastic about attending. Carla revealed that in any given educational technology-focused professional development session, “you’ve got the people in the back row who are checking their email...people in the front row who are trying to get this and then you’ve got the people in the middle who are discussing other things.” Teachers state that they need more time for educational technology-focused professional development, but as Guskey and Yoon (2009) found, more time does not equate to more effective use of technology if the time provided to teachers is not used wisely. In this study, administrators have observed teachers who are not active participants in professional development. This does not indicate that teachers always use their time effectively during professional development.

The espoused theory vs. theory-in-use (Argyris & Schön, 1996; Jones, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Paese, 2017) explains that there is a disconnect between what individuals say they do compared to what they actually do. This is corroborated with the administrator-participants’ views on teachers’ use of technology in the classroom compared to what administrators observe. For example, in this study administrators described that teachers often used an assessment website in place of

effective instruction. The administrators discussed how teachers utilize an assessment website for content review because they thought it was an effective way to implement technology in the classroom. Arnold stated that he observed teachers using the assessment website as “their instruction for the day. It’s just you guys [students] use [the assessment website].” From the perspective of the administrator-participant, this strategy does not seem to be the most effective use of a valuable technology tool for a 90-minute class period.

Another observation made by administrators relates to the use of paid subscriptions for educational tools and websites. Beverly stated, “We’re paying for these subscriptions and they [some teachers] really weren’t using them because they didn’t really understand the benefit[s] of it [them].” Conversely, Carla noted that some teachers will use technology tools for the sake of using the technology tool because they may think “I’ve gotta use this, so ‘dadgumit’, we’re going to use it!” Beverly described how she teamed up with Carla to attend content-specific team meetings to work with content-areas on best-practices when implementing the subscriptions to technology tools.

There was corroboration between administrators and teachers’ descriptions that there is simply no time to effectively integrate technology in the classroom with the current state of educational-technology professional development. Beverly stated, “It’s one more” thing to add to teachers’ workloads. She went on to explain that if she were a teacher and felt as though a technology tool is “going to be burdensome, it’s out.” Lisa explained that “other stuff you’re going to be doing at home” prohibits teachers from having enough time to plan for technology implementation. The other stuff Lisa referred to related to family obligations. There is a limit on what teachers can accomplish for

their classrooms. Meetings with monotonous paperwork, planning content, developing assessments, and assessing student understanding can make technology integration difficult to fit into teachers' daily planning.

Positive observations. In this study, positive observations describe times when administrators observe that teachers use the educational technology-focused professional development to effectively implement technology in the classroom. This contrasts with the previous subcategory because it reflects times when administrators have observed teachers using technology appropriately to enhance student learning. Examples of positive observations are described below. Also, there was not as much in the administrator interviews concerning positive observations of teachers in professional development or the classroom. This is not to say that teachers do not utilize educational technology effectively in their everyday instruction, it was just not addressed as often in the interview. Beverly described that teachers use GAFE to formatively assess students. "I've seen Google Forms in that way, exit tickets, those types of things." Beverly and Arnold agreed that the school- and district-based professional development that focused on GAFE has enabled teachers to use GAFE with their students and with their colleagues. They described using Google Docs to collaborate in data teams and Google Classroom to provide students with resources and assignments.

Summary. The third theme of this study focused on the perceptions of administrators. This is important because administrators play a role in developing the structure for professional development. The administrators of this study described how they envision teachers using technology in the classroom, recalled observations of teachers during educational technology-focused professional development and while

teachers were observed using technology as a teaching tool. These explanations impact how educational technology-focused professional development is structured.

Theme: School-level administrators want to provide more time, applicability, and differentiation into educational technology-focused professional development, but teachers need to be active participants.

In a study of using mobile computing devices, administrators' support played a key role in the utilization of technology by teachers (Grant et al., 2015). In this current study, the administrator-participants specifically identified time, applicability, and differentiation as components of effective educational technology-focused professional development. These components are teacher-centered (Diaz-Maggioli, 2004; Fenton, 2017) characteristics of professional development and align with teacher-participants' needs and preferences as well. However, administrators in this study also explained that teachers must play an active role in professional development sessions for the sessions to be most effective. This theme is an interpretation of the perspective of administrators' preferences for educational technology-focused professional development and has similarities to the previous theme.

Just as today's classroom has shifted to be more student-centered, so should professional development. In a study of iPad integration, it was found that professional development should be more teacher-centered where teachers are provided time to collaborate (Fenton, 2017). Administrators in this study described that they want to provide more teacher-centered educational technology-focused professional development. This theme has two major categories, each with subcategories. The

categories include (a) format of professional development and (b) teacher-focused suggestions.

Format of professional development. This category is defined as the flow, or organization, of educational technology-focused professional development sessions. This category explains how administrators prefer to set up educational technology-focused professional development. This category further corroborates four of the seven characteristics teachers prefer as seen in the previous theme because it closely aligns to teacher preferences for the format of the sessions.

In a longitudinal study of factors that increase the effectiveness of professional development indicate that teachers benefit most when they are from the same department and school, participate in active learning, and are provided with feedback (Desimone, Porter, Garet, Yoon & Birman, 2002). The administrators in this study want to be champions of technology integration by providing effective educational technology-focused professional development for teachers. There are four characteristics of formatting that were described by administrators. The characteristics include (a) content-related grouping, (b) differentiated grouping, (c) offering more practice time during sessions, and (d) modeling with feedback.

Content-related grouping. In this study, content-related grouping is a characteristic that is defined by grouping teachers with their common-subject peers. This could be that all English teachers attend the same sessions or have time to collaborate together during sessions. The administrator-participants were asked to provide suggestions to current educational technology-focused professional development to help teachers better integrate technology in their classes. Mitchell described how he would

recommend that the district-level content coordinators be responsible for finding content-specific technology tools for teachers. He said:

Yeah, something that is 100% applicable to that department because for [Carla] to try to find a program or an app or some type of technology that is, that is utilized by art and science and math—it's almost impossible. Right? And it's probably as watered down as you can get. Whereas if you found something very specific and very strategic from those coordinators, whether it's to help Algebra I, it was Biology, or whatever it is. I think that would be more effective because you can actually see the relevance.

Mitchell described that content-related grouping would provide more relevance to the teachers and allow for more effective integration of technology tools. In the other administrator-focus group interview, Beverly said a similar statement when she described her own personal experience. She explained that she participated in a graduate-level technology course and that it was applicable to her role in the school. She continued and said, "So I would imagine...that course for teachers is all around...what is useful in the classroom." Administrators have similar preferences for educational technology that is content-focused to allow teachers who teach the same subject-matter the opportunity to collaborate.

Differentiated grouping. The administrator-participants in this study described that differentiated grouping refers to grouping teachers based on ability levels. This is consistent with the recommendations from the teacher-participants because they suggested that sessions be broken into ability levels (i.e., sessions for advanced, proficient, and beginner teachers). Beverly said,

I also think scaffolding your PD ... I'm going into one of those [with] teachers who don't even know how, where Google Classroom is. It's frustrating to me. So, I am making my [grocery store] list while the instructor is helping that person But there is nothing more mind-numbing to sit and waste my time at a training.

From her perspective, she described how she would focus on personal or unrelated activities when she was in a session that was not differentiated for her abilities. Administrators have observed teachers who do not solely focus on the educational technology-focused professional development sessions (i.e., grading papers, checking email, online shopping, talking to colleagues, etc.). Their statements corroborate with those of the teacher-participants. Administrator-participants expressed that professional development needs to be tiered in a way that can help meet teachers where they are in their knowledge of utilizing technology tools in the classroom.

Offering more practice time during sessions. In this study, teachers and administrators explained that it takes time for teachers to develop the skills to use technology effectively in the classroom. The teacher-participants focused on more practice time during professional development sessions whereas the administrators tended to describe more time embedded throughout a school year to focus on a limited number of technology tools. Arnold, an administrator, stated that teachers need “time to master an understanding, develop an understanding of what they’re doing.” Mitchell, an administrator, described his ideal educational technology-focused professional development for teachers to be able to focus on one track for an entire year. He said:

I don't like 'one and done's', so whether it's a simple program or whatever, I [the teachers] pick a single track and become a master of it over the course of the entire year And go to your next PD session you're [teachers are] going to have tried it and then you can bring it [reflection from using the technology] back and you can troubleshoot. Ok, now I've got [this technology tool]. It's just like...a kid. Once you filled the gaps with them, and you can take the next step, and as you progress and they get to know [how to use the technology tool], you will eventually become a master of that particular program as opposed to just throwing [a technology tool] up against the wall at the beginning of the year to see if it sticks.

Mitchell described that he was a proponent of training teachers how to use fewer technology tools in order to develop expertise with the tools so they can learn to integrate them more effectively with students. With selecting a limited number of technology tools, it will take more time to focus on a fewer number of technology tools.

Modeling with feedback. The administrator-participants in this study described two types of modeling that should be included in educational technology-focused professional development. Lisa described that the school does not “have a good system in place for teachers to observe model teachers doing lessons [that integrate technology].” She suggested teachers should observe master teachers who regularly incorporate technology in the classroom. This modeling can serve as a means for teachers to begin to think about how they can utilize technology with their students. She then continued by saying, “And then how can I [the teacher who observes a model teacher] have that person [the model teacher] come in and watch me do it?” Lisa then described that the master

teacher could observe the novice teacher. She was suggesting that the model teachers offer constructive criticism through observations of the novice technology-integration teachers.

On the other hand, Arnold described that professional development sessions should incorporate modeling. He began suggesting that the facilitators model how to use tools in order for the teachers to develop an understanding of the technology tool. This is similar to the teachers-participants' suggestions about being the student in professional development sessions. He then explained that teachers should develop a product based on seeing it modeled. He continued:

I think a lot of times our professional development is talking sometimes [lecture-based] or maybe you're sitting down and you're at a computer and maybe you're doing it right. Maybe you are not, but the chance to go through the steps and have somebody say, that's good, that's bad. You need to work on this.

Arnold described that teachers need to have facilitators model effective strategies when incorporating tools, then allowing teachers to practice incorporating the tools into their lessons. He also explained that the facilitators should be available to offer suggestions to teachers during practice time. Lisa also explained that administrators do observations on teachers but are not experts in the content. She stated, "That's where I think, like you [Mitchell] said, that time as content specialists [inaudible] can lead back to some feedback to follow up on that end." When facilitators model how to use a technology tool, teachers may be able to emulate how that technology tool is used when they incorporate it into their classrooms. However, administrators want to provide teachers

with feedback from content specialists to help them ensure that the technology tool is being implemented effectively with students.

Teacher-focused suggestions. In this study, this category reflects administrators' need for teachers to play an integral role in planning for and participating in educational technology-focused professional development. Diaz-Maggioli (2004) described that professional development should include collaboration between administrators and teachers to ensure professional development is teacher-focused. Researchers posit that "teacher agency is a critical element for motivation through the sense that their contribution is valued, and their professionalism trusted" (Tondeur et al., 2016, p. 118). This category relates to administrators' preferences for educational technology-focused professional development and reflects how administrators want to provide sessions that are school-based, teacher preference-based, as well as holding teachers accountable for participating in sessions.

While administrator-participants expressed that they want to incorporate teacher-focused strategies in educational technology-focused professional development, they also explained the need to evaluate whether teachers are effectively integrating technology. In their book on school leadership, Carbaugh, Marzano, Toth, Houpt, and Sahadeo-Turner (2015) explain that teachers should be evaluated based on multiple data points. These data points can include observations, student surveys and growth, peer feedback, and self-evaluated videos. Some of these were suggested by the administrators in this study, which can be used to determine if technology integration is incorporated in the classroom. This category is comprised of three subcategories: (a) holding teachers accountable, (b) providing local sessions, and (c) focusing on teacher preferences.

Holding teachers accountable. An interesting conversation occurred near the end of the interview. The administrator-participants were asked how they would change educational technology-focused professional development to make it better. After Mitchell described that teachers should be able to pick one focus for the year, Lisa described how it should be connected to observations, similar to a practicum experience, followed by feedback. We also discussed that in the current district-level professional development that teachers stay with the same group throughout the year and have three meeting times. As a professional development facilitator, I have asked the teachers in my group to provide evidence (i.e. a newly created lab, student artifacts, or pictures of students working on a particular assignment) to post in our Google Classroom. Lisa, from the perspective of a teacher, said, “I’m not going to do your inquiry lab and I’m not going to work on that until the summer when I’ve got time off. Because I don’t have time in the day to day...it’s not required of me.” She then followed her statement with a discussion concerning check-ins and feedback. “You knew you, as a student teacher...you knew...my professor is coming today. It’s like I knew I had to get that done.” Although she understands that teachers have limited time to provide evidence of technology integration by turning in an assignment, Lisa explained that if teachers were to be held accountable through announced check-ins and observations with immediate feedback, that teachers would increase their effective integration of technology with their students. For Lisa, this would help teachers because they would not have to remember to turn in an assignment, but it would still hold them accountable for integrating technology in their classrooms.

Providing local sessions. Local sessions are professional development sessions that occur within the walls of the school. While the school offers 45-minute educational technology-focused professional development sessions, the administrator-participants would like to see more long-term sessions available locally. This can be with teachers at the same school or through online means. Arnold stated, “I think as much as possible, you want to have things locally. It’s hard enough to get teachers to go if you tell them you’ve got to go to another school after school to do it [professional development].” He was empathizing with teachers because they are tired at the end of a school day. He expressed that for teachers to have to drive to another location to go to professional development may deter them from taking part in educational technology-focused professional development.

Focusing on teacher preferences. Throughout both of the administrator-focus group interviews, administrators described that teachers’ preferences for educational technology-focused professional development should play a role in planning for professional development. Arnold said, “People have been at the district office for so long and they’re not truly in the classrooms, that they’re not in touch with what teachers needs are.” Mitchell also described that he wants “teachers to pick a focus for the year.” This focus would be based on teachers’ needs and preferences, rather than those needs and preferences of the district office. Arnold made a suggestion to take teachers’ needs and preferences into consideration when planning when he stated, “I think the thing that should always happen is you send something out to teachers and say, ‘What do you need?’ and you build from the ground up. You don’t say, ‘Here’s what we’re offering,’ ” Administrators in this study agreed that teachers’ needs and preferences should be taken

into consideration when planning for educational technology-focused professional development.

Summary. The fourth theme of this study reflects the suggestions from the administrators at Lakeside High School. They described two ways in which educational technology-focused professional development should be organized. Formatting professional development included content-related grouping, differentiated grouping, offering more practice time during sessions, and modeling with feedback. Administrators also offered teacher-focused suggestions which included holding teachers accountable, providing local sessions, and focusing on teacher preferences. The characteristics that administrators described should be considered when planning for educational technology-focused professional development.

Theme: Current educational technology-focused professional development does not always meet the needs of all teachers to support educational technology integration in the classroom.

The participants in this study described how their experience with educational technology-focused professional development sessions do not provide enough time, content-focus, or differentiation to meet the needs of all teachers at Lakeside High School. Multiple researchers have identified inadequacies in current professional development sessions, such as the lack of focus on content-specific knowledge and time to practice new skills (Garet et al., 2001; Hechter & Vermette, 2013; Hsu, 2016; Prieto-Rodriguez, 2015; Tondeur et al., 2017). Their findings are similar to the findings of this study.

In this study, there is close alignment and corroboration between teacher- and administrator-participants for perceptions of the current state of educational technology-focused professional development at Lakeside High School. Additionally, administrators feel their disconnection from the classroom makes it difficult to know what teachers need and want in educational technology-focused professional development. Corroborating views will be discussed, followed by the unique perspective of the administrator-participants.

Corroborating views of teachers and administrators. Teacher- and administrator-participants explained multiple examples of reasons why current educational technology-focused professional development does not meet their needs to allow for technology integration in the classroom. Teacher and administrator views concerning the current educational technology-focused professional development offerings overlapped. The corroborating views of teachers and administrators include: (a) too many technology tools, (b) lack of applicability, (c) lack of differentiation, and (d) lack of content-specific peer collaboration and practice.

Too many technology tools. In this study, teachers and administrators both expressed concerns that teachers are introduced to many different tools during a single technology-focused professional development session or in a short period of time. Participants mentioned that the introduction of multiple tools does not meet their needs. During discussion of this issue, participants' conversation tended to overlap with their concerns about the time they have to learn and practice with the implementation of new technology tools. Linda stated, "there are too many programs in one session." Similarly, Rick stated, "They [administration and/or district] put out something new

every other month.” Introducing teachers to multiple technology tools does not provide time for in-depth practice and effective application of the tools in the classroom.

Administrators tended to agree. For example, Carla acknowledged, “Sometimes I just feel like I'm just throwing stuff at them, and I hate that.” The other administrators nodded in agreement. While there are many tools teachers can use in their everyday instructional practices, it is not beneficial to provide professional development on multiple tools in a short period of time (Williamson & Reddish, 2009). In this study, teachers and administrators explained that the number of tools introduced in a short period of time prohibits educational technology-focused professional development from meeting their needs.

Lack of applicability. The lack of applicability refers to professional development that does not apply to the content-area of the participating teachers. For example, art teachers do not have a need for multiple choice-focused formative and summative assessment tools. However, they have been expected to participate in the professional development sessions that focus on those assessment tools. Science teachers need more professional development to learn how to use data collection programs that have been purchased with department money. However, there has not been professional development time allotted for this. In this study, teachers and administrators both asserted that educational technology-focused professional development sessions regularly focus on tools that are not applicable to teachers’ content-area or needs. Multiple researchers found that effective teacher professional development incorporates applicability for teachers (Hew & Brush, 2007; Koehler & Mishra, 2009). This subcategory focuses on ineffective professional development sessions that incorporates

tools that render little to no value to the teachers participating in professional development. The lack of applicability of professional development exemplifies how current educational technology-focused professional development is not meeting the needs of teachers.

During a teacher-focus group interview Jasmine stated, “There's some really awesome stuff out there that I just don't need to use I have other uses of my time, and I would be sitting in a meeting that didn't apply to me.” An example she provided described her methods to assess students. She stated that her art students created artwork as summative assessments rather than answering multiple-choice and short-answer questions. The district purchased an online assessment platform that allows teachers to formatively and summatively assess students. Although Jasmine does not assess her students with multiple-choice and short-answer questions, she was still required to attend a professional development session focused on the online assessment program, which did not apply to her course content or her assessment needs.

Along the lines of applicability, Donna noted that she does not enjoy “topics that do not relate [to] or support my curriculum Decision makers forget that technology supplements content and curriculum. It [educational technology] doesn't replace it.” Although she attends sessions as required, she stated they are not applicable to her content-area and teaching needs.

Mitchell, an administrator, is aware that teachers do not like to participate in educational technology-focused professional development “because they find most if it hasn't been relevant to them A lot of times we don't do a good job of choosing PD [professional development] that's relevant, that is beneficial to the teachers.” The other

administrators in Mitchell's group also agreed with "uh-huh's" and head nods that teachers did not find sessions relevant to their needs. The teachers and administrators in this study both said that the lack of applicability and relevance makes the current district- and school-based educational technology-focused professional development ineffective.

Lack of differentiation. The lack of differentiation during educational technology-focused professional development occurs when teachers of a range of technology-ability levels or range in willingness to become technology proficient are in the same session without planning for the differing ability-levels (Fenton, 2017). Lack of differentiation is another reason that teachers do not have their needs met during educational technology-focused professional development. This subcategory is distinct from the other subcategories because it is focused only on the technology proficiency, or willingness to become technology-proficient, of the teachers participating in professional development sessions.

In each teacher- and administrator-focus group interview, participants explained that lack of differentiation is a problem with educational technology-focused professional development at Lakeside High School. Other researchers indicated that all teachers do not learn how to use technology tools the same way, nor in the same amount of time (Diaz-Maggioli, 2004). In professional development, teachers are the learners. Teachers are expected to differentiate instruction to meet the needs of learners in their own classrooms. Just as students are at different ability levels, so are teachers. In this study, the participants expressed there was little difference in the professional development that is available to experienced teachers versus novice teachers or teachers who attend unwillingly.

For example, Delilah stated, “I have a Masters [degree] in EdTech. And so it’s not...not fair to that person or to me if we’re starting with, you know, here’s how to organize your Gmail Some people need that.” Delilah expressed that it was not fair for technology-novice teachers to feel rushed during educational technology-focused professional development, nor is it fair for her to have to learn about something she already knows how to do. This particular teacher is quite savvy with technology. She already has her own website, utilizes Google Apps for Education (GAFE) daily, and other Web 2.0 tools to increase student collaboration and showcase her students’ work through online portfolios. When Delilah, who has a firm grasp on technology integration, attends professional development sessions she often learns about tools she already uses in her classroom. Delilah and would benefit from more in-depth, advanced educational technology-focused professional development that would not be appropriate for technology-novice teachers.

Teacher- and administrator-participants also identified varied levels of willingness to participate in educational technology focused professional development. Lisa said that teachers who are unwilling to attend educational technology-focused professional development oftentimes want technology team members to “come in and do all of the integration, and then they never learn.” She indicated that teachers who are unwilling to learn how to use technology are dependent on the technology team to lead their students in required technology tasks. Teachers often need extra assistance after technology sessions because the sessions are not differentiated to fit the needs of all technology proficiency levels of teachers.

Additionally, Arnold and Beverly contributed further evidence for differentiation as a reason why professional development does not meet the needs of teachers:

Arnold Often the biggest challenges with veteran teachers who are very set in their ways: ‘This is the way I’ve always done it. I don’t need to try something new.’

Beverly And acquiring the skill set. So taking the time and participating in our trainings. Um, oftentimes it’s the same people who are, um, are, are very well versed in technology, are the ones that attending They’re [veteran teachers or those unwilling to learn about technology] often resistant. Okay. Or they turned down the opportunities, I should say.

In this study, there is a lack of differentiation for novice technology-learners and proficient technology users, as well as teachers who are resistant to learn about technology and those who are well-versed in educational technology.

In an administrator-focus group interview, I asked how the participants felt about the competency and comfort level of teachers after completing a technology-based professional development session. Carla said, “that’s a hard question [be]cause you [have] got different levels in a session.” Carla was describing that in the current educational technology-focused professional development that teacher-participants have a wide range of technology-proficiency. Throughout each administrator-focus group interview, multiple administrators noted times when Carla had to spend additional one-on-one time with teachers after completing technology-professional development sessions because the teachers did not understand how to use the technology after the

session. Technology-novice teachers have a difficult time understanding how to use technology tools introduced during sessions. They rely on the technology team to provide one-on-one instruction. Traditional professional development does not provide differentiation based on teacher-technology proficiency levels. However, professional development should incorporate teachers' experiences and needs (Diaz-Maggioli, 2004). In this study, there was a wide range of ability levels, but educational-technology professional development does not take need for different teacher-technology proficiency levels into account.

Lack of content-specific peer collaboration and practice. In this study, lack of content-specific peer collaboration refers to the time provided during educational technology-focused professional development for teachers to collaborate in content-specific groups, such as biology-content groups and U.S. History-content groups. It was also apparent from participant interviews that there was also very little practice using technology during sessions. This is another example of how educational technology-focused professional development does not meet the teachers' needs at Lakeside High School. In this study, planning time is not specifically allocated for teachers to collaborate with content-peers and practice in order to develop instructional strategies that incorporate technology tools that they have learned in professional development sessions. This category focuses on collaboration between content-specific groups rather than solely on the individual needs of teachers.

Multiple researchers have indicated that professional development should be content-specific for optimal outcomes (Ertmer & Ottenbreit-Leftwich, 2010; Garet et al., 2001; McGee, 2015). For example, Jenny stated, "There's never enough time for

collaborative planning because it's not built into our schedule.” A similar statement came from Nora: “It's not only the practice, but it's the process, and then the collaborate[collaboration] and the discuss[ion].” In these statements, teachers explain that they need time that is dedicated to content-specific collaboration in order to plan effective instructional strategies that incorporate technology.

Teacher-participants in this study also identified that time to practice using the tools they learn in educational technology-focused professional development was not available. Donna stated, “I don't appreciate sessions in which there is not enough time to understand and practice what we are focusing on in the session.” Similarly, Malachi said, “Sometimes, it feels rushed that all we are getting is the ‘how’ but not actually given that time to *do* and put the tech into practice.” Linda agreed, “I feel like I do not get enough time with a single program to really dig into and set up something I can use when I return to the classroom.” Kaitlyn stated, “I use my planning period, sometimes, to try to get help from available people.” In this study, educational technology-focused professional sessions did not set aside enough time to provide teachers the opportunity to practice and collaborate with content-specific peers.

In the administrator-focus groups, administrators also explained that the lack of collaboration and practice are reasons why educational technology-professional development did not meet the needs of teachers. They cited logistics as the reason why time isn't available. Mitchell stated, “You don't have common planning...typically amongst your teachers.” Beverly stated, “But like, ‘let's talk about how we're going to integrate technology into our lesson design,’ yeah, I would say almost never because...there's no time.” Administrators agreed that teachers are not given dedicated

time to practice and collaborate in order to plan for effective integration of technology into their lessons.

Administrators' distinct perceptions. Although there was overlapping perceptions between the teachers and administrators in this study, administrators did discuss some ideas that were distinct from teachers. They described two reasons that kept educational technology-focused professional development from meeting the needs of teachers: (a) administrators' disconnection from the classroom and (b) interruptions during educational technology-focused professional development sessions. Researchers identified that administrators have too many tasks to know first-hand the needs of teachers (du Plessis & Eberlein, 2017). This category describes how teacher-participants' needs are not met and specifically addresses distinct reasons why administrators feel educational technology-focused professional development does not meet teachers' needs.

Administrators' disconnection from the classroom. In this research, the administrator-participants described how their disconnect from the realities of the classroom make it difficult to know what teachers need for educational technology-focused professional development. For the purposes of this study, disconnect is defined as the time that has passed since administrators were classroom teachers. The realities of the classroom include the everyday activities of teachers (i.e. interrupted planning time, paperwork, grading, parent communication, making copies, preparing for lessons, etc.). For example, Mitchell noted that there are numerous tasks that teachers attend to each and every day, and "you just can't throw one thing at them when they've got 50 other things going on and expect it to be implemented correctly." Arnold also suggested:

People have been at the district office for so long, and they're not truly in the classrooms, that they're not in touch with what teacher[s'] needs are I think the thing that should always happen is you send something out to teachers and say, 'What do you need?' And you build it from the ground up. You don't say, 'Here's what we're offering'...because your needs are going to be different than any school.

The last part of this quote reflects that the needs of teachers at individual schools within the same district may differ. However, he suggests that the professional development offerings are currently set by the district staff as a one-size-fits-all model. Both of these administrators in separate interviews acknowledged that the current educational technology-focused professional development at Lakeside High School does not meet the needs of teachers because administration is not privy to the challenges of being a classroom teacher.

Interruptions during educational technology-focused professional development sessions. In this research, the administrator-participants described that interruptions, including district-mandated topics, prohibit school-based educational technology-focused professional development from meeting the needs of teachers. For example, Carla noted that they are required to include topics unrelated to educational technology in their professional development sessions from time to time. She said, "There's things that we have to bring in just because...we have everybody together." During the professional development sessions throughout the year, administrators have to discuss district- and school-initiatives and topics (i.e., sexual harassment, safety drills, review of teacher duty schedules, review of content-specific team meeting procedures, etc.). The time spent

reviewing these initiatives and topics often coincides with educational technology-focused professional development because the entire faculty is in attendance. This causes the professional development session to be cut short from educational technology training.

Interruptions to teacher-focused professional development occur on professional development days. Teachers typically have little time to work in their classrooms, let alone collaborate with their peers for technology-integration planning. Arnold, who has been in the district for over 20 years, has seen time to collaborate dwindle. He explained, “Now we’ve gotten to a point where almost every minute is occupied with something. It goes back to you having to do this on your own time. And some people feel like they already get enough time out of me.” In this portion of the interview he was describing how district-mandated topics take away potential time away from teachers to be able to practice and collaborate. He perceived that teachers do not want to spend more time on their own learning how to implement technology because the district and school already consume enough time.

Summary. The first theme of this study explained the current state of educational technology-focused professional development at Lakeside High School. This theme was divided into two categories. The first category reflected corroborative views between teachers and administrators in this study. They shared that their experiences with current educational technology-focused professional development included too many technology tools, lack of applicability, lack of differentiation, and lack of content-specific peer collaboration and practice. The second category represented the perceptions from administrators which included two subcategories: administrators’ disconnection from the

classroom and interruptions during educational technology-focused professional development sessions. These descriptions provided the foundation for issues with the current structure of educational technology-focused professional development.

Theme: Teachers face difficulties when attempting to integrate technology in the classroom.

In this study, this theme reflects teacher- and administrator-focus group data. When teachers face difficulties attempting to integrate technology in the classroom. Difficulties such as technical support, technology proficiency, student problems, and lack of time may decrease the overall integration of technology with students (Hsu, 2016; Inan & Lowther, 2010). This theme focuses on issues teachers have when attempting to integrate technology, with or without professional development. Corroboration between teacher- and administrator-participants in this study focused on three main reasons that make technology integration difficult: (a) technology integration is overwhelming, (b) student issues, and (c) technical issues.

Technology integration is overwhelming. In this study, teachers felt overwhelmed when integrating technology with students. This aspect of technology integration is an important aspect of why teachers face difficulties when integrating technology. Previous research has shown that short training sessions may not prevent technology integration from being overwhelming for teachers (Lee, Longhurst & Campbell, 2017). Participants in this study described three reasons why teachers felt overwhelmed: (a) transitioning from one platform to another, (b) forgetting how to use technology tools learned in professional development, and (c) utilizing free or beta versions of technology tools.

Transitioning from one platform to another. A platform is defined as the basic hardware or operating system from which other applications for classroom purposes are run. This subcategory addresses the learning curve teachers faced as they had to transition from one platform to another in a short period of time. Prior to this study, all high school teachers and students in the district utilized iPads as the 1:1 device. After five years of learning how to use the iPad and Apple applications, the district transitioned to Chromebooks, which were already in use at the middle schools. There was a difficult transition period when the Chromebooks were issued to teachers.

Malachi said, “The most difficult time had to be when we first started using a platform in school.” He went on to describe how he originally used Edmodo to post assignments for students, then had to learn how to post materials in Google Classroom. Sadie also shared a similar experience:

Because we don’t have iPads anymore and we have the Chromebooks that we had to, like, reconfigure and we download it differently because it just didn't work the same. So, like I said, we spent all this time creating this thing and it worked on one media, like the iPads, and then all of a sudden it didn't work the same on the Chromebooks. And it was just, like, frustrating.

The teachers in this study expressed distress when learning how to use a new technology tool. However, transitioning from one technology tool that required time to learn (i.e., iPads) to another technology tool that required time to learn (i.e., Chromebooks) can be overwhelming for teachers.

Administrators also noted that in any case, teachers tended to feel overwhelmed when their new technology tools did not work as expected. For example, Beverly said,

“When you’re going live with something and it’s new to you...it’s uncomfortable.” So, administrators expressed a more generalized anxiety for teaching using new tools while teachers expressed the changed in computer devices specifically. There seemed to be strong consensus between the administrators and teachers that even when teachers have training on how to use technology tools, they are overwhelmed when access to technology tools change and they have to adjust to the new tools.

Forgetting how to use technology tools. Teachers in this study described how they learn about technology tools and forget how to use them when they attempt to incorporate them in their classrooms. This is consistent with the other subcategories because it contributes to teachers feeling overwhelmed when they attempt to use technology. Some teachers have been introduced to technology tools during professional development that would be useful in their classrooms. However, if teachers are unable to take the time to learn how to use the tool, they may forget how to use it or even forget the name of the tool or login information for the tool.

Delilah explained that for her it is not necessarily professional development that is the issue, she said, “if you do a ‘drive by’ of Actively Learn, say in six months from now [since the professional development session]...I know it exists...let me see if I can remember my log on” information. Delilah and Penelope also described that online textbooks were not very user-friendly, and they did not remember how to use the online version. Arnold stated, “I think it is more likely that a teacher may have had instruction on a tool but don’t [doesn’t] recall details and are scared to ask for clarification.” Arnold pointed out that some teachers are hesitant to ask for help when they forget how to use a new technology tool. Although teachers are provided with relevant tools, they may not

always remember how to use the tools. This makes technology integration overwhelming for teachers.

Utilizing free or beta versions of technology tools. In this study, teachers have been introduced to technology tools during professional development sessions that provide many different qualities (i.e., track student data, embed higher-order-thinking questions, access to lesson libraries, etc.). From my experience, the versions that are often shown in professional development are the paid versions of the application that include many extra features. The paid versions can be cost prohibitive for teachers, but often times technology tools have a free version for teachers to try. Free versions are often similar to the paid version of the tool but have very limited features (i.e. teachers cannot access individual student data, only a certain number of students can be entered into the program, etc.). For example, educational extensions through Google Slides (e.g., PearDeck, NearPod) enables teachers to increase collaboration in the classroom. However, when teachers only have access to the free version, they cannot collect student-specific information and the types of questions and activities the students can participate in are limited (Grant & Mims, 2009). There are also tools that roll out new versions, but those options are often in beta. Beta versions of tools are initial versions that may still have a few technical issues. Research explains that the beta versions are first used by beta testers to provide feedback for the developer of the technology tool (Stavova, Dedkova, Ukrop, & Matyas, 2018), but some teachers may not know that the technology tool is in beta version. This subcategory describes two factors that cause teachers to feel overwhelmed when they use technology, however, it only relates to application-specific issues.

In this study, teachers indicated that during educational technology-focused professional development they have been introduced to technology tools that they find useful. However, when they use the technology tools, they realize that they only have access to the free versions of the tools. Delilah explained that she has been using a website hosting service for student portfolios that has been free “and now you can only do so much for free and then you have to pay.” When Delilah initially began using the original web hosting service everything was free. As the popularity of the service increased, many of the options were only available in the paid version. While she has transitioned students to a different website hosting service, it is a learning curve for her and the students.

Likewise, administrators have observed teachers who become frustrated because they are using a beta version of a technology tool. Carla recalled a time when a teacher used the new quiz feature of Google Forms. She described that he “was all excited and he just jumped in ... he’s giving an assessment and [Google Forms’ quiz feature] isn’t working...because it was still in beta.” The teacher made plans to assess his students, but the tool did not work as he thought it would. This made him overwhelmed when the technology tool did not work as he thought it would work.

Student Issues. In this study, teachers describe that student issues can make it difficult to integrate technology into lessons. Student issues include (a) readiness of students to use technology and (b) time necessary to teach students how to properly use technology. This category describes student issues that cause teachers to feel overwhelmed when they try to incorporate technology in the classroom. In a study of teacher and student experiences with one-to-one technology, disadvantages of using one-

to-one models occur when students fail to bring in charged devices (Jacobson, 2017). Although teachers expressed that teaching students to use technology takes a great deal of time, researchers posit that time should be spent in order to develop the 21st century skills of students (Lisenbee, 2016).

Readiness of students to use technology. In this study, readiness of students describes whether or not students are prepared to participate in class by bringing a charged Chromebook or having a charged Chromebook. Teachers in this study described that students are not always responsible enough to bring their district-issued mobile device to school or bring it with a sufficient charge to complete work. When we discussed difficulties using technology in the classroom, Stacy explained, “I also sometimes struggle with kids not bringing Chromebooks charged and we tell them they can’t bring chargers.” Other teacher-participants nodded their heads in agreement with Stacy’s statement. The school policy requires students to bring charged devices to school. The chargers are expensive and are often lost by students. In my own experience, students do bring their Chromebook chargers to class or borrow from another student. There are often safety hazards as the cords are stretched out from the wall to their desks. The media center has started to provide charging stations for students to bring their Chromebooks to charge. The school has recently provided loaner Chromebooks for students who do not have a charged device.

Time necessary to teach students how to properly use technology. Teachers in this study also described that, although students utilize technology for social purposes, they do not come in knowing how to perform simple tasks related to academic

work. Nora and Jasmine both described scenarios they see on a regular basis in their class as evidence that it takes time to teach students how to properly use technology.

Nora: The generation that has been enriched with all of this [technology], they [students] don't really come knowing how to use things except for, like, Snapchat and Instagram and just specific really tight knowledge that they know how to do this, they know how to do that. But they [students] can't look at, like, their Chromebook and say, 'Okay, this isn't working. What do I [student] need to do'?

Jasmine: Because they've had Chromebooks throughout, when you put them on a regular computer, like a desktop computer, because we have, you know, a lab to do all photo editing and stuff. They have no idea. Basic stuff like creating a folder and naming a file and where to save the file destination. They're like, 'I saved it. Where'd it go?' And I'm like, 'where did you save it what did you name it?' So, I can search for it and they will do stuff on the computer and then save it to their home drive, which is the one that they can access at any of the desktop computers. And then they're like, 'It's not in my drive because they then go right to their Google drive and assume it's there.' And I'm like, no, no, no. You saved it to the computer network. You haven't actually uploaded it. And the words upload and download, they have no idea that they're different, I'm like download means to bring towards you. Upload means to push

away, and they have no concept of that prior to it being explained.

And I'm talking freshmen through senior, we have that issue

because they're used to it just all being done.

These two teachers specifically have to take time out of their lesson plans to teach students how to complete tasks that seem to be tasks that students should already know how to do. Delilah added, "It's going to limit them when they get to college and are working on a different platform." Jasmine also said, "I don't know what kind of kids y'all teach, but if they're the same as mine, they're like, well, I tried once and it didn't work, so I'm done." Although teacher-participants identified that their students could use technology for social media and communication, teachers worry that students give up so easily when using technology tools at the high school level. This is supported by research that indicates students are mistakenly identified as being able to seamlessly incorporate technology into their learning (Kirschner & De Bruyckere, 2017; Neumann, 2016). Teacher-participants worry that students are not going to be able to easily adjust to new platforms and programs when they graduate from high school.

Technical issues. Teachers and administrators in this study described many examples of technical issues. Technical issues are problems that teachers have with hardware or some aspect of the district network (Walsh & Farren, 2018). This category describes difficulties for teachers when they attempt to utilize technology, but it does not relate to professional development or issues with students. These technical issues are consistent with first-order barriers to technology integration as seen in many studies (Ertmer & Ottenbreit-Leftwich, 2010; Kopcha, 2012).

In this study, teachers described experiences with technical issues that deter them from incorporating technology in their classrooms: (a) reliability of the district network, (b) district filtering systems, (c) downloading plugins and applications, and (d) issues with hardware or online programs.

Reliability of the district network. Teachers pointed out that when they incorporate technology into a lesson, the network is not always reliable. For example, they have to have another plan in case the network goes down, which some do not have a back-up plan. While teachers explain that the problem of network outage has been better recently, at least one or more teachers in each interview described that loss of internet made it difficult to rely on technology for their daily lesson plans. For example, Penelope said, “We used to have the internet drop.” Delilah followed up when she said, “Last year was a huge, last two years really, it’s been an issue, but this year it’s been better.” When teachers do experience network reliability issues, they have to continue teaching. If a teacher does not have a back-up plan when the network is down, classroom instruction can suffer if they are unable to troubleshoot (Chang, 2019; Grant, Ross, Wang, & Potter, 2005). Arnold, one of the administrators, described that he observed a teacher when the class was presenting projects. He said,

The teacher had them do the parts of their presentation that didn’t involve the visual side of it because they [the students] had some verbal presentations as well. I mean it was a pretty decent adjustment for that teacher, but frustrating. Both teachers and administrators agree that network reliability cause difficulties for teachers when they attempt to utilize technology in class.

District filtering system. While the district filtering system prohibits students from visiting websites or downloading materials that are inappropriate for academic purposes, there are resources that teachers reported using that were blocked. Nora explained, “We [classes] can’t watch, uh, an educational video about something that I’ve linked in there [Google Classroom].” She is describing that when she finds an appropriate video on YouTube, she cannot share it with students in Google Classroom because YouTube is blocked for students. Katilyn also expressed that she is “unable to access websites due to [the websites] being blocked.” In my personal experience, websites that I have used in previous years are often blocked by the district filtering system. There is a vetting process that must occur before the websites can be unblocked or app, software, or extensions can be approved. This process initially occurs at the school through the technology team. Once a new tool or website has been researched to ensure appropriateness, it is then taken to the district to be further researched and approved by the instructional technology team and content coordinators, and then it is submitted to the district technology services for security checks and implementation. The vetting process may take up to a few days to weeks, so it is important for teachers to check websites’ and other technology tools in advance to ensure it is appropriate. While this may seem like an easy issue to fix, not all teachers have the opportunity to check every website in enough time prior to their lesson to have the website unblocked.

Downloading plugins and applications. The district has become stricter with downloading applications on district-issued devices for both students and teachers. There are on-site technology technicians that can download programs (i.e., test banks, textbook resources, online applications, etc.). The district has also vetted many applications and

has a district-approved catalog of Google applications that is easily accessible to teachers and students. However, teachers explained that downloading plugins and applications can make it difficult to integrate technology in the classroom. Jenny explained that one of her main difficulties include “having to download a plugin for the 100th time.” There is still a debate as to the reason this occurs. The online testing company said that it is an issue with the district network, while the district does not believe it is an issue with the network. This was reiterated by Kaitlyn who said, “I have to download [the online testing plugin] updates all the time.” This does not seem to be an issue, but from personal experience, the plugin has to be downloaded multiple times a day or even multiple times in one class block. Many times, the plugin has to be downloaded as students are supposed to be taking their assessment. This particular program requires updates more often but downloading applications must be approved by the district vetting process. By the time teachers realize they need permission to download a program, it is too late to go through the process. This technical issue makes it difficult for teachers to want to integrate technology in the classroom.

Issues with hardware or online programs. Hardware or online programs are not always reliable when they are used with students. The entire district has SmartBoards installed in nearly every classroom. Teacher-participants compared older versions of the SmartBoard to the newer versions that were installed when the building was updated. The older versions of the SmartBoard, teachers expressed, were more interactive and had better functionality with students. For example, Nora said, “I mean that [SmartBoards] used to be something that I used all the time at the other schools and had the kids come up and really interact with it and now it’s just, it just doesn’t work

well.” This was corroborated by Jackie and Linda in another teacher-focus group interview. The most current set of SmartBoards have a hard surface and do not allow students to come to the board to touch the board, instead they have to use a special pen that is specific to each board. The pen is not very user-friendly, and the teachers do not utilize the SmartBoards for their intended purpose, to increase interaction. Linda also said, “The hardware does not work on demand.” I did not ask for examples of hardware, but from experience, teacher-laptops do not function as smoothly when they are older. However, laptops are only replaced every five years or when they have stopped functioning completely. Nora also uses various types of assistive technology she finds online in her special education classes. She said, “You’re not sure what’s gonna work and what’s not, like for PDFs, we don’t really have anything that reads everything to them all the time.” The special education department has used multiple applications to help students who have trouble reading. This makes it difficult for teachers to integrate technology in the classroom.

Summary. The fourth theme of this study conveys difficulties teachers face when they attempt to use technology with their students. The teachers explained that technology integration was overwhelming, especially when transitioning from one platform to another, forgetting how to use technology tools, and utilizing free or beta versions of technology tools. While all of these are difficult, student issues and technical issues can compound the problem. These difficulties impact how the teachers in this study use technology with their students.

Chapter Summary

In summary, this chapter revealed teachers' preferences and needs for technology integration in the classroom. This mixed-methods research utilized the results from a survey and multiple focus group interviews to describe how teacher-participants and administrator-participants perceive educational technology-focused professional development.

Quantitative data indicated that teachers have a low-level of 21st century skill integration, a higher than expected number of teachers who are hesitant to incorporate newer technology tools, and teachers are neutral about their experiences with educational technology-focused professional development. Qualitative data revealed six themes that teachers are reflective of teachers' needs and preferences, as well as administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development. Table 4.18 categorizes each theme based on the teachers', administrators', and corroborating perspectives.

Table 4.18. *Themes Categorized Based on Teachers', Administrators', and Corroborating Perspectives*

Teachers' Perspectives	Administrators' Perspectives	Corroborating Perspectives
<ul style="list-style-type: none">Teachers' technology integration is reflective of their willingness to participate in and seek out professional development, as well as previous experiences using technology in the classroom.	<ul style="list-style-type: none">Administrators' perceptions of teachers' technology integration are reflective of observations of teachers' willingness to participate in professional development and technology integration in the classroom.	<ul style="list-style-type: none">Current educational technology-focused professional development does not always meet the needs of all teachers to support educational technology integration in the classroom.

Teachers' Perspectives	Administrators' Perspectives	Corroborating Perspectives
<ul style="list-style-type: none"> The support system for educational technology integration should remain, but educational technology-focused professional development needs to be structured to allow teachers to effectively plan and implement technology in the classroom. 	<ul style="list-style-type: none"> School-level administrators want to provide more time, applicability, and differentiation into educational technology-focused professional development, but teachers need to be active participants. 	<ul style="list-style-type: none"> Teachers face difficulties when attempting to integrate technology in the classroom.

CHAPTER 5

DISCUSSION, RECOMMENDATIONS, IMPLICATIONS, AND LIMITATIONS

The purpose of this action research was to identify and describe teachers' needs and administrators' perceptions of teachers' needs for educational technology-focused professional development at Lakeside High School in Central School District in order to make recommendations for future professional development. Both quantitative (i.e., teacher survey) and qualitative data (i.e., teacher- and administrator-focus group interviews) were collected for data analysis. Quantitative and qualitative data were collected and analyzed to answer two research questions: (1) What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School? and (2) What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School? This chapter converges the findings of this study with the literature on educational technology-focused professional development in order to discuss and situate the findings. The (a) discussion, (b) implications, and (c) limitations of this study are explored below.

Discussion

It is important to situate the findings of this research within the larger context of research for educational technology-focused professional development. To answer the

research questions, the quantitative and qualitative data were combined and considered through a lens of research-based characteristics of effective professional development that focuses on instructional technology. The discussion is organized by the two research questions of the study.

Research Question 1: What are teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?

In this study, teachers' preferences are defined as the methods of learning preferred by teachers for professional development in educational technology. On the other hand, teachers' needs are defined as practices that teachers want to focus on in order to learn how to effectively utilize technology in their classrooms. Ultimately, teachers value professional development that will meet the needs of their students (Ertmer & Ottenbreit-Leftwich, 2010). This research question will be addressed in two sections: (a) teachers' preferences and (b) teachers' needs.

Teachers' preferences. Although characteristics of effective professional development have been identified (Diaz-Maggoili, 2004; Ertmer, 1999; Garet et al., 2001; Mouza, 2002), most professional development is not effective because it is not teacher-centered (Diaz-Maggoili, 2004). The teacher-participants described preferences for educational technology-focused professional development that align with some of the characteristics of effective professional development models. Diaz-Maggoili (2004) compares characteristics of traditional professional development with those that are a part of visionary, or teacher-centered, professional development. For example, traditional professional development revolves around top-down decision-making, attempts to fix what is wrong with teachers, relies on a one-size-fits-all approach, lacks meaningful

follow up, and utilizes pedagogical techniques (Diaz-Maggoili, 2004). However, teacher-centered professional development provides adequate support, includes collaboration among stakeholders, relies on growing teachers, employs techniques for all ability-levels, provides support, and uses andragogical techniques (Diaz-Maggoili, 2004).

These characteristics align with other research related to effective teacher professional development which include modeling (Ertmer, 1999; Martin, Strother, Beglau, Bates, Reitzes, & Culp, 2010), active learning (Desimone et al., 2002; Garet et al., 2001; Mouza, 2002), content relatedness (Desimone et al., 2002; Ertmer, 1999, Ertmer & Leftwich-Ottenbreit, 2010), and differentiation (Fenton, 2017; Minor, Desimone, Lee, & Hochberg, 2016). Also, the ISTE-A standards specifically address that empowering leaders build confidence and competence in teachers so that teachers may integrate technology (ISTE, 2009).

However, these characteristics are not typical of current educational technology-focused professional development as expressed by the teachers and the administrators in this setting. The findings of this study indicated that teacher-participants prefer four characteristics for educational technology-focused professional development that are comparable to the existing research for characteristics of effective professional development. These characteristics include a focus on fewer technology tools, applicability and practicality, differentiation, and modeling. While these characteristics do not completely align with current research on effective professional development, the teacher-participants preferences align with some effective professional development characteristics.

The teacher-participants in this study revealed that they are not provided time to attain mastery-level when working with technology tools. This corroborates with previous research that suggests teachers should be given the opportunity to select only those technology tools they might like to incorporate in their classrooms according to their needs and interests (Xie et al., 2017). Linda described her frustration with the number of technology tools when she said, “I do not get enough time with a single program to really dig into and set up something I can use when I return to the classroom.” Likewise, Sadie explained that she felt “very overwhelmed ... [be]cause it’s like, ‘here’s a million things I want to tell you’” rather than focusing on a few specific technology tools. The quantitative data also indicated that teacher-participants wanted to incorporate technology in their classes but needed more time to learn how to do so. Teacher-participants were very close to agreeing that they get excited about using new technology in the classroom ($M = 3.85$; $SD = 0.93$). However, they were neutral on whether or not educational technology-focused professional development was worth the time ($M = 3.39$; $SD = 1.14$) and were between neutral and agree for not having enough time to learn how to use technology tools ($M = 3.48$; $SD = 1.16$).

The teachers in this study stated that they wanted to have the opportunity to select educational technology-focused professional development sessions based on their own needs. For example, when discussing whether or not technology sessions have had an impact on classroom instruction, Delilah said that the technology tools she has been introduced to during staff professional development have not been “necessarily applicable for my students...or for my teaching style.” In terms of practicality, Jenny said, “having time to make a product that I can actually use in my class” would be

helpful. Likewise, quantitative data revealed that teachers agree that learning new technologies they can use in their classrooms is important and that integrating technology is pertinent to their curriculum.

Interestingly, there was a large proportion of the teacher-participants (28%), who identified as a laggard in terms of Rogers (2001) diffusion of innovation levels. They do not use technology until they are positive that it will not fail on them. According to the laggard classification, many teacher-participants are content with their current instructional strategies. Teacher-participants acknowledged that technology integration is important, but qualitative data suggests that teachers want to learn about technology tools that are applicable and practical to their classrooms.

Strategies for differentiation should be included when planning for educational technology-focused professional development (Fenton, 2017; Minor et al., 2016). Teacher-participants described their frustration with sessions that did not consider the various levels of technology proficiency. For example, Jackie explained that sessions should be “focused, level-specific, well-labeled sessions so teachers can join the appropriate skill level class.” Similarly, Sadie said, “some differentiation would be nice because she [or he] might not need what I need.” Some teachers need to have one-on-one help when they do not understand how to use technology tools. However, other teachers need very little help while other teachers may need one-on-one assistance. Teacher-participants explained that they prefer differentiated educational technology-focused professional development sessions that take their level of technology-integration into consideration. In any case, it is incumbent upon teachers to purposefully select the topics and levels of professional development that meets their individual needs.

Previous research asserts that professional development that includes modeling has one of the strongest associations with high-quality lesson plan quality (Martin et al., 2010). Teacher-participants described that they want professional development facilitators to model how to utilize technology with students. It is also advantageous for teachers to observe other teachers who have effectively integrated technology (Ertmer, 1999). For example, Linda described that she wanted to be “the student” in professional development sessions. Similarly, Delilah said that she likes when facilitators go “over the ‘x’ number of things she [the facilitator] wants to show you and then gives you time to get in and play with it.” Quantitative data indicated that teacher-participants agreed that technology can be an effective tool for student learning. Modeling allows teachers to experience or observe effective instructional technology integration so they can create their own technology-enhanced lessons (Desimone & Pak, 2017; Hamilton, 2013).

Teachers’ needs. Teachers’ needs for professional development align with previous research which includes a focus on content-specific grouping (Garet et al., 2001; Desimone et. al., 2002), access to technology facilitators (Lewis, 2016; Liu et al., 2017), and inclusion of 21st century skills (NEA, n.d.; Tucker, 2014). In this study, findings suggested that teachers’ needs for educational technology-focused professional development includes the aforementioned practices that teachers want or need to focus on in order to learn how to effectively utilize technology in their classrooms.

Collaboration among teachers has been identified as an essential piece of professional development (Garet et al., 2001; Desimone et. al., 2002; Mouza, 2002). Professional development that allows for content-specific peer collaboration and practice increases the effective integration of technology in the classroom (Beeson, 2013;

Ertmer & Ottenbreit-Leftwich, 2010; Garet et al., 2001; Hutchinson & Woodward, 2014; Tondeur et al., 2016). Likewise, multiple studies suggest that teachers benefit from active learning where they are able to practice using technology tools (Basagekar & Singhavi, 2017; Enkanayke & Wishart, 2015; Ertmer & Ottenbreit-Leftwich, 2010; Garet et al., 2001; Hechter & Vermette, 2013; Hew & Brush, 2007). Collaboration combined with practice with content-specific peers enables teachers to brainstorm strategies to incorporate technology while meeting the curriculum standards (Desimone et al., 2002; Garet et al., 2001). When teachers are grouped with colleagues who do not have the same content needs, they may learn how to use a technology tool, but they may not consider the various ways to incorporate the tools into their curriculum.

Many of the teacher-participants stated that they prefer to collaborate and practice with their content-specific peers. For example, Stacy said, “content-based learning where tools are introduced and we are given time to work with the new tools in our data or shared course teams” would be ideal. Similarly, in the survey, teacher-participants indicated that they were neutral when it came to the amount of time needed to prepare technology-based lessons deters them from creating lessons ($M = 3.16$; $SD = 1.14$). However, teachers indicated that integrating technology was pertinent to their curriculum ($M = 3.90$; $SD = 0.96$). Both quantitative and qualitative data suggest the need for content-specific collaboration and practice are needed for educational technology-focused professional development.

Teacher-participants described the benefits of having a school-based technology team to support their instructional technology integration efforts. Jenny explained, “Having a [DIS] at our school is really helpful and shows that our administration supports

us.” Kaitlyn also said, “[The DIS] and other members of the technology team have been a huge support to me.” Researchers have found that an increase in school technology support, including coaches (Lowther, Inan, Strahl, & Ross, 2008), increases effective technology integration in the classroom (Lewis, 2016; Liu et al., 2017). The school-based technology team provides assistance to teachers in many ways. They organize and operate educational technology-focused professional development, assist teachers with one-on-one assistance with technology integration ideas, create assignments and assessments when teachers do not have the time, and help teachers integrate technology with students.

In order to ensure that students are prepared for life beyond the classroom, teachers need to integrate 21st century skills in their classroom (NEA, n.d.; Tucker, 2014). Researchers posit that teachers need to be well-versed in technology integration and their own 21st century skills in order to support and scaffold student learning (Sheffield et al., 2018). The state Department of Education describes the profile of graduates to have world-class skills. The 21st century skills are the skills listed as world-class skills. The district also promotes that students should be prepared for the 21st century. Therefore, teachers are encouraged to increase 21st century skills and technology integration in the classroom. However, most teachers do not include 21st century skills in their lesson plans because of top-down mandates that require high-stakes testing (Spratt, 2019) or because they are not properly trained on how to incorporate 21st century skills.

Teachers utilize technology for organizational purposes, review of material, online activities, and as a diagnostic tool to gauge student learning rather than utilizing

technology for integrating 21st century skills. For example, Linda said, “Google Classroom, videos, Quizziz, USA Test Prep, Adobe Spark, and PowerSchool” were the technology tools that she used in the classroom. Adobe Spark has the potential to infuse 21st century skills into lessons, but Linda did not elaborate on how she uses it with her students. Only three teacher-participants described technology-integrated lessons that incorporate two of the 21st century skills, communication and creativity. Delilah and Stacy described how they use digital portfolios for student research and communication. Similarly, Jasmine described how her students created videos showcasing their artwork. They participated in a gallery walk to communicate with their classmates.

Quantitative data suggests that teachers incorporate 21st century skills approximately one to three times a month. In terms of critical thinking skills, comparing information from different sources before completing a task or an assignment had the lowest rating ($M = 2.79$; $SD = 1.28$) on a five-point Likert-scale. Collaboration skills were also low. However, teachers do allow students to work in pairs or small groups ($M = 3.79$; $SD = 1.08$). Of the communication skills that had the lowest, preparing and delivering oral presentations the lowest rating of the subscale ($M = 2.21$; $SD = 1.02$) had the lowest rating on the survey. Creativity and innovation skills had two items that scored lower than 1-3 times a month ($M = 2.66$; $SD = 1.29$). The two items were to have students invent a solution to a complex, open-ended question or problem and create an original product or performance to express their ideas.

From my own experience, Webb’s Depth of Knowledge (1999) has been a focus of administrator checklists on teacher observations. There is not a specific section in the administrators’ observation application that includes 21st century skills. This may be due,

in part, because schools are driven by standards and questioning. These are the features administrators are looking for during teacher observations. Focuses on standards and questioning may impact the likelihood of teachers incorporating 21st century skills in their classrooms. Based on the triangulation of qualitative and quantitative data, teachers at this school do not regularly utilize technology to incorporate 21st century skills.

Research Question 2: What are administrators' perceptions of teachers' needs and preferences for educational technology-focused professional development at Lakeside High School?

The ISTE-A standards (2009) call for administrators to ensure that technology is effectively infused in all areas of this school. Research suggests that teachers may believe that they incorporate technology effectively in the classroom, but oftentimes teachers' perceptions may be incorrect (Ertmer & Ottenbreit-Leftwich, 2010; Paese, 2017). In this study, administrators' perceptions of teachers' needs and preferences consider their observations of teachers during educational technology-focused professional development and while teachers integrate technology in the classroom with students. This research question will be addressed in two sections: (a) alignment between teacher- and administrator-participants and (b) characteristics of teachers and professional development that administrator-participants prefer.

Alignment between administrator- and teacher-participants. While prior research corroborates with this study that professional development is more effective with content-specific grouping (Garet et al., 2001; Desimone et. al., 2002; Ertmer, 1999, Ertmer & Leftwich-Ottenbreit, 2010) and differentiated grouping (Fenton, 2017; Minor et al., 2016), there is conflicting research on the amount of time needed for professional

development. Although research is unclear on the optimal amount of time teachers should participate in professional development, studies have indicated that 20 hours (Garet et al., 2001) to 100 hours (Banilower, Heck, & Weiss, 2007). However, it is important to note findings from Guskey and Yoon (2009) who posit that more professional development time is not beneficial if teachers are not actively engaged and participating.

Both administrator- and teacher-participants aligned in their preference for content-specific and differentiated grouping as well as more time for educational technology-focused professional development. For example, all administrators commented that teachers were not provided enough, uninterrupted, time to collaborate with colleagues who teach the same subject. Issues that prohibited administrators from providing time to teachers included state and district initiatives and lack of common planning at the high school level.

Prior research indicates that differentiation is important to incorporate into educational technology-focused professional development sessions because it provides teachers instruction while taking into consideration their level of comfort and expertise (Fenton, 2017). Similarly, previous studies have found that differentiation is important because teachers take away information from professional development sessions based on their prior knowledge (Minor et al., 2016). When administrator-participants were asked about the comfort and competency of teachers after a session, Carla said, “that’s a hard question [be]cause you [have] got different levels in a session.” She described how the different levels included ability-levels of the teachers and differing levels of focus. Qualitative data was clear on the need for differentiated educational technology-focused

professional development. These findings align with teacher-participants' perceptions of their own comfort and competency after an educational technology-focused professional development session.

The literature cites examples of the need for quality time for teacher collaboration and practice (Guskey & Yoon, 2009; Saunders, 2014). Although participants want to see more time embedded into educational technology-focused professional development, more time does not equate to greater gains in effective implementation of technology (Guskey & Yoon, 2009). However, research indicates that high-quality professional development that is sustained over time is needed in order to have a positive impact on instructional practices (Banilower et al., 2007; Penuel, Fishman, Yamaguchi, & Gallagher, 2007). Therefore, educational technology-focused professional development should be sustained over time.

Characteristics of teachers and professional development that administrator-participants prefer. Administrator-participants described that they wanted teachers to incorporate technology seamlessly so that teachers' work will be more streamlined. For example, Lisa described that technology integration should make their "work smarter, not harder." However, administrators described that teachers do not fully participate in educational technology-focused professional development sessions in order to learn how to integrate technology. Administrators, especially Beverly and Mitchell, seemed to understand that teachers are overworked and do not want to participate in professional development that is not relevant. Beverly suggested, "I think people are tired And when on Earth am I going to find time [to learn how to integrate technology] There's so much on their plates." When asked why teachers do not participate in educational

technology professional development, Mike said, “because they might find most of it hasn’t been relevant to them.” Administrators in this study seem to be aware that teachers have responsibilities in and out of the classroom that prohibit teachers from effectively integrating technology in the classroom.

Administrators want teachers to use technology to enhance instruction and described three characteristics that would make educational technology-focused professional development effective. The characteristics administration prefers include positive attitudes and participation from teachers, accountability, and locally-based sessions.

Administrators in this study described that some teachers do not fully engage in educational technology-focused professional development. For example, Arnold described that some veteran teachers do not participate in professional development because they do not want to try anything new. Beverly also noted that the teachers who are proficient in technology participate while those teachers who are not technology proficient do not attend sessions. Similarly, Carla said, “You’ve got people in the back row who are checking their email.” Each administrator-focus group was able to recall times when teachers did not fully participate and engage in professional development. Professional development is not beneficial if teachers are not active participants (Guskey & Yoon, 2009).

Modeling did not have the same meaning for administrator-participants. They described a method of modeling that aligned with coaching (Cox, 2015; Desimone & Pak, 2017; Heineke & Polnick, 2013; ISTE, 2020). Instructional coaching is a part of professional development that aims to unlock the potential of teachers and provides a

collaborative relationship between the coach and classroom teacher (Cox, 2015). In this study, administrator-participants described that teachers should have the opportunity to “observe model teachers doing lessons,” “have something modeled for [the teacher] and then [the teacher has] a chance to develop a comfort level with it,” and be provided with “immediate feedback.” Lisa also mentioned “feedback and follow up, maybe you have a practicum experience” which would require administrators to observe teachers utilizing technology with students. The administrators would then provide timely feedback to teachers. This contrasted with teachers who described the need to have technology modeled for them.

Studies show that on-site or decentralized teacher professional development is more effective than centralized professional development (Ingersoll & Collins, 2017). One administrator-focus group interview included a discussion centered on the location of professional development. The administrator-participants described that teachers should be provided with quality sessions for educational technology-focused professional development in their own school. For example, Arnold said, “It’s hard enough to get teachers to go if you tell them ‘You’ve got to go to another school after school.’ ” He explained that teachers are tired after a full day of teaching and do not want to have to drive to a central location in the district to participate in professional development. Similar to studies in the effectiveness of online professional development (Nelson & Bohanon, 2019; Saifuddin & Strange, 2016), Beverly said that she would like to see professional development delivered virtually so that teachers can participate in professional development when it is convenient for them rather than driving to an off-site location.

Recommendations for Educational Technology-focused Professional Development

Through this research, I have developed recommendations for educational technology-focused professional development to guide me as a district-level professional development facilitator, encourage educators participating in professional development, and assist educational leaders who plan for professional development.

Educational technology-focused professional development is critical in order to properly train teachers to prepare students to become world-class graduates. The state describes world-class graduates as students who have 21st century skills. The International Society for Technology in Education (ISTE) has made the recommendation for students, teachers, instructional and technology coaches, schools, and educational leaders that promote 21st century skills (ISTE, 2020). This section describes (a) recommendations for practice and (b) recommendations for working within constraints.

What Teachers Want in Professional Development

The teacher-participants in this study described many of the needs and preferences for educational technology-focused professional development that are consistent with the existing research (Diaz-Maggioli, 2004; Ertmer & Ottenbreit-Leftwich, 2010; Garet et. al. 2001). There are current aspects of instructional technology that teachers want to remain, while there are a few suggestions for changing the structure and availability of technology tools.

Teacher-participants described that they were appreciative of the consistency in tools and platforms used throughout the school. For example, teachers are able to communicate with parents, students, and other colleagues using GAFE, such as Google Classroom, Google Calendar, Google Docs, and Gmail. Teachers at this site have had

professional development sessions that focused on using GAFE to enhance communication, collaboration, and organization. The district and school have placed a high priority on technology integration by offering a school-based technology team that consists of a DIS, ISRT, and TTLs. Each member of the school-based technology team works to ensure all hardware, Wi-Fi connections, and software function properly. The technology team also works with the technology leaders at the district to communicate information to the faculty and staff. The current aspects that teachers want to continue include platform consistency and the presence of a school-based technology team.

While there are aspects that teachers want to remain for technology integration, they described a few changes they prefer when it comes to educational technology-focused professional development. Teachers explained multiple examples to alter the structure of the current model of professional development and they described preferences for technology tools.

Teacher-participants described seven characteristics of professional development they prefer. organizing sessions that are solely tech-focused, sharing practical tools, provide the option for self-paced PD, and more practice time. Modeling includes observing how a facilitator uses technology in the classroom (Mouza, 2002). Teacher-participants want to work with their content-specific peers to develop meaningful lessons that integrate technology (Garet et al., 2001). However, they also described the need for differentiated grouping so that those who are more proficient with technology can further their use of technology while those who are not proficient with technology can have more assistance (Fenton, 2017). Teacher-participants described the need for professional development that is uninterrupted and focuses on technology integration. Along the same

lines, teacher-participants expressed the need for learning about practical tools that can be applied to their content. Some teacher-participants value the option for self-paced professional development rather than attending a professional development session. Lastly, nearly all teacher-participants explained that professional development should have practice time embedded.

Teacher-participants' described two additional aspects to be taken into consideration when planning for professional development. Teacher choice in technology tools and school or district invest in paid versions of widely used technology tools. This is consistent with prior research that indicates teachers preferences should be taken into consideration for planning educational technology-focused professional development (Liao et al., 2017). The teachers in this study described that they wanted the opportunity to learn about content-appropriate tools during professional development. They also expressed the need to be provided with the same paid versions of technology tools that are used during professional development sessions.

What Administrators Want in Professional Development

In this study, teachers and administrators aligned in many of their preferences for the format of educational technology focused professional development. For example, administrator-participants described that professional development should be formatted for content-related grouping, differentiated grouping, and include more practice time. While administrator-participants also aligned with teachers concerning the need for modeling, administrator-participants described modeling with feedback. This type of modeling was described with teachers observing master teachers who seamlessly integrate technology in the classroom. Also, similar to other studies on classroom

coaching (Desimone & Pak, 2017; Ertmer & Ottenbreit-Leftwich, 2010; Mouza, 2002; Sugar, 2005), administrator-participants described that teachers should have technology modeled for them and administrators should observe teachers using technology in the classroom, followed by timely feedback.

Administrator-participants also described three teacher-focused suggestions. The suggestions included holding teachers accountable, providing local sessions, and focusing on teacher preferences. Administrator-participants explained that teachers can be held accountable for integrating technology through classroom observations. After classroom observations administrators would provide timely feedback for teachers. Oftentimes, professional development sessions are held off campus at a centralized location. One administrator in particular described that professional development should be held at the school so that teachers do not have to drive elsewhere. Similarly, another administrator-participant explained that virtual professional development may increase teacher participation in professional development. Lastly, administrator-participants explained that teachers' needs and preferences should be considered when planning or professional development. In other words, teachers should be able to choose the tools and topics covered during professional development.

Recommendations for Practice

Teachers should be provided with “relevant, job embedded and just in time” professional learning opportunities that are diverse to meet the needs of all teachers (ISTE, 2020). Based on my findings and existing literature for educational technology-focused professional development, I am recommending a plan to provide ongoing

professional learning that incorporates technology that is based on the essential conditions set forth by ISTE (2020).

Recommendation #1: Diversity in professional learning opportunities. There are many ways in which professional learning can be implemented to enable teachers of all technology-ability levels to integrate technology in the classroom. Teachers should have multiple options to participate in professional learning. Research-based options for professional learning are described below.

- Online courses have the potential to be an effective choice for individual teachers who do not require traditional delivery of material. Learning can occur at a time and place that is convenient for the learner (Misra, 2018; Tossell et al., 2015).
- Classroom coaching establishes a nurturing environment where teachers are a part of a learning community (Beglau et al., 2011; Desimone & Pak, 2017; Ertmer & Ottenbreit-Leftwich, 2010). Virtual or on-site coaches should provide a shared vision for technology integration, hands-on learning for teachers, and modeling of skills related to technology integration (Sugar & Van Tryon, 2014).
- In this particular setting, school-based technology teams should remain, but their roles should include a stronger emphasis on coaching teachers through their instructional technology integration. Often instructional technology coaches do not have a defined role, which can decrease the effectiveness of the coach (Heineke & Polnick, 2013).

- Collaborative teams allow teachers to create technology-enhanced learning experiences for students (ISTE, 2020). Members of a collaborative team work together to improve their collective teaching practices in a nonevaluative manner (Bates & Morgan, 2018).

Recommendation #2: Meet teachers' needs and realities. Teachers in this study explained that educational technology-focused professional development does not meet their needs. A needs assessment that determines felt and anticipated needs (Morrison et al., 2013) should be employed to analyze the school needs, performance needs, training needs, and individual needs (ISTE, 2020) within the school. Following the needs assessment, the administration should evaluate the reactions, learning, behavior, and results of teachers following the implementation of professional learning (ISTE, 2020). The importance of a needs assessment is provided below.

- A needs assessment allows administrators to make data-driven decisions to create a professional learning program that enhances teachers' technology integration (Rossett, 1995).
- The administration team should utilize a needs assessment that takes into consideration teachers' self-assessed skill levels, technology use and integration, teacher beliefs, barriers to access, professional development resources, leadership, needs and wants, and demographics (O'Reilly, 2016). The results of the needs assessment can determine the type of professional learning opportunities offered to the teachers.

Recommendation #3: Develop incentive structures for teachers. According to ISTE (2020), incentive structures encourage teacher-participation in professional

learning. Teachers can take part in the planning and implementation of professional learning and they can be rewarded for successfully completing formal and informal professional development. Recommendations for providing teachers incentives are described below.

- Teachers are often incentivized to take part in the overall process of planning professional development when they are dissatisfied with their current professional development structure (National Research Council, 2007). This allows teachers to take ownership of the professional development process. In this setting, teachers have the opportunity to apply to be a district-level professional development facilitator or member of the school-based technology team. These options should still be available to teachers.
- Microcredentialing allows teachers to take control of their professional learning by documenting their learning in formal and informal settings. Microcredentialing is competency-based, personalized, on demand, and shareable (Berry, Airhart, & Byrd, 2016). Teachers can select professional development based on their own needs, their students' needs, and at their own pace. Teachers can also share their micro-credentials in email and on social media. Microcredentialing offers performance-based assessments of teacher learning and typically adheres to specific standards set forth by certification agencies (Foshay & Hale, 2017).

Recommendation #4: Focus on integrating technology into instructional practices. Educational technology-focused professional development should focus on integrating technology into instructional practices rather than focusing on technology tools and teachers' attitudes about integrating technology (Davies & West, 2014; Koehler & Mishra, 2009). Modeling, content-specific collaboration, and practice using technology should be integrated into professional learning (Garet et al., 2001; Hechter & Vermette, 2013; Hsu, 2016; Prieto-Rodriguez, 2015; Tondeur et al., 2017). Educational technology tools should be seamlessly interwoven into professional development. Teacher-participants explained that current educational technology sessions are not applicable to their content needs. Therefore, teachers should be presented with professional development that they can use in instructional practices that are appropriate for their content. Practices that focus on integrating technology into instructional practices are described below.

- According to Koehler and Mishra (2009), expert teachers have the ability to simultaneously incorporate technology, pedagogy, and content into their everyday lessons. Teacher professional development should place a strong emphasis on pedagogically sound practices rather than using technology tools (Davies & West, 2014). Therefore, less emphasis should be placed on technology tools. Rather professional development sessions should focus on content and pedagogy with the use of technology tools.
- Modeling should be included in professional learning opportunities (Mouza, 2002). Teachers should experience effective technology-based

instructional strategies through modeling by a facilitator and brainstorm ways to incorporate the strategies in their own classrooms.

- Content-specific collaboration is essential for teachers to develop instructional practices and lessons that effectively integrate technology (Ertmer & Ottenbreit-Leftwich, 2010; Garet et al., 2001; Koh, 2018).
- Embedded practice time or active learning, followed by constructive feedback of newly attempted instructional strategies can improve classroom technology integration (Desimone & Pak, 2017; Garet et al., 2001).

Recommendation #5: Help teachers implement technology. Teachers may not always effectively integrate technology with their students. Therefore, teachers need assistance when incorporating technology and troubleshooting as problems arise. The following research-based strategies that help teachers implement technology are examined below.

- Coaching and situated professional development, particularly for teachers who are not proficient with technology integration, may increase self-efficacy of teachers (Sugar, 2005).
- Researchers posit that if teachers did not have to troubleshoot hardware issues, then more time can be spent on planning effective technology-enhanced lessons (Sandholtz & Reilly, 2004). Also, teachers' beliefs about integrating technology impacts their implementation of technology (Tondeur et al., 2017). Therefore, a highly qualified technology team is valuable and should continue at the school and district to ensure the

reliability of that first- and second-order barriers are not prohibiting the use of instructional technology. Examples of first-order barriers include access to equipment, time, training, and support (Ertmer, 1999). Second-order barriers relate to teachers' beliefs about teaching with technology, which can be impacted by first-order barriers (Ertmer, 1999).

Recommendations for Working within Constraints

Current school and district constraints. There are multiple school and district constraints that prohibit the implementation of effective educational technology-focused professional development. Oftentimes schools and districts must ensure compliance with state mandates regarding time for collegial professional development, high stakes testing, teacher observations and evaluations, and district initiatives (Everitt, 2018; Weaver, 2004). These constraints may prohibit effective implementation of professional learning.

For example, during our district-wide professional development, teachers are not permitted to leave until the exact time set by the district. While requiring a minimum amount of time seems to be the goal at the district level, the state Department of Education requires school districts to have three days to be used for professional development (Education General Provisions, 2013). Does seat time ensure actual professional learning has occurred or is seat time simply a way to ensure compliance? Although research has shown that more time spent in professional development increases change in teaching practices (Banilower, Heck, & Weiss, 2007; Garet et al., 2001), Guskey and Yoon (2009) assert that more professional development time is not beneficial if teachers are not actively engaged and participating.

Outside of self-reported surveys conducted at the conclusion of district-wide professional development sessions, is there a way to truly measure whether or not a teacher benefits from professional development? For example, Kirkpatrick (2006) posits that there are four levels to evaluate programs (e.g., educational technology-focused professional development). The first level is reaction, which measures how participants react to the program. The second level is learning, where participant knowledge has improved. Level three is behavior, when there is a change in the participant's behavior as a result of the program. Finally, level four is results, where the program has made a positive impact on the participant's work. In the case of an educational technology-focused professional development at this site, teachers are evaluated through surveys. These surveys determine teachers' reactions (Level 1) and learning (Level 2) (Kirkpatrick, 2006). However, the school and/or district does not measure Levels 3 and 4. To do this the teachers would be observed and evaluated based on their knowledge gained from professional development but implemented in their classrooms (Kirkpatrick, 2006).

Following state mandates (Education General Provisions, 2013), our district has three days of district-wide professional development. This includes four hours each designated professional development day followed by school-based professional development. Individual schools in the district are responsible for the school-based professional development requirements for the rest of the day. In light of teacher-participant descriptions, specified time in professional development is not an indication of the effectiveness of the professional development. Assessments of learning could include actual teacher products that result from content-focused, collaborative

professional development or observations of teachers effectively integrating 21st century skills and technology into their classrooms.

The state legislature has established a performance-based accountability system (Educational Accountability Act, 2008). The intent of the accountability system is to improve teaching and learning. One way the state measures accountability is through high stakes testing (Educational Accountability Act, 2008). Schools and districts cannot abstain from testing students (Education Accountability Act, 2017). As a result, they use professional development time to discuss test-taking strategies and analysis of overall student performance (Turchi, Johnson, Duncan & Montgomery, 2002). Our students currently perform very well with regard to end-of-course exams, advanced placement exams, and college entrance exams (State School Report Card, 2020). However, these tests and the accompanying skills do not prepare students for the state goal of preparing our students to be world-class graduates. Professional development opportunities should be balanced to accommodate students' preparations for working in an information and knowledge economy (State Department of Education, 2015) and success on tests.

As a part of recertification, administrators must complete teacher observation and evaluations (State Department of Education, 2020). The district has a digital platform to record notes and check items when making teacher observations. The different sections of the form include the following: standards and objectives, motivating students, presenting instructional content, lesson structure and pacing, activities and materials, questioning, thinking, academic feedback, grouping students, teacher content knowledge, teacher knowledge of students, and qualifying measures. Although depth of knowledge (Webb, 1999) is a focus on the form, the other components of 21st century skills (i.e.,

communication, collaboration, and creativity) are not apparent on the form. This form is reflective of the state Department of Education's (2020) 4.0 teacher evaluation rubric. While the state Department of Education describes the profile of a graduate as having world-class knowledge, world-class skills, and life and career characteristics (State Department of Education, 2015), the profile is not reflected in classroom observations. Teachers are not evaluated whether or not they integrate 21st century skills or life and career characteristics.

The district has five initiatives that serve as the basis for district-wide professional development. The initiatives include Response to Intervention, educational technology integration, data teams for data-driven decision making in the classroom (data teams), Positive Behavior Interventions and Support (PBIS), and state adopted standards. Teachers have the freedom to select a focus for the year. The particular focus they choose will determine the professional development sessions they attend on the three district-wide professional development days. Even though teachers are asked to bring their district-issued devices to professional development, technology is not explicitly embedded in all professional development sessions.

Data teams are a focus at the district-level, but each teacher is required to be a part of a data team that meets on one morning a month and one afternoon a month. Data teams are meant to collect and analyze data prior to the beginning of a unit in a common formative assessment that is developed by the teachers in the data team. The data team sets goals based on the needs of the students and also discusses instructional strategies used to assist students based on their prior knowledge. Throughout the unit there are supposed to be meetings to check student progress. Lastly, there is a final meeting after

students have taken the same common formative assessment to determine if the students met their goals. While making data-driven decisions to improve student learning sounds ideal, the organization of the mandatory meeting times is set in a rigid manner. For example, data teams meet on the two specified days and must complete paperwork as evidence for the meeting. However, teachers do not schedule their units around the mandatory meeting dates. Therefore, they spend more time completing paperwork than they do making data-driven decisions (Lockton, 2019). Perhaps a more effective way to track teachers' data-driven decisions is allow teachers to record minutes that include documentation of attendance, an agenda of the meeting, goals met during the meeting, and plans for future meetings.

Working within school and district constraints. The school and district in which this research site is located has a system in place for educational technology-focused professional development. However, constraints set forth by the state and district make it difficult to ensure effective facilitation of professional learning that enhances technology integration with sound pedagogy and content knowledge. As stated in Recommendation Two, administration should determine the needs of their faculty prior to planning for professional development by conducting a needs assessment (O'Reilly, 2016; Rossett, 1995).

Currently, there are multiple ways that teachers are able to participate in educational technology-focused professional development throughout the school year. The three district-wide professional development days, short school-based days each month, and semester-long graduate courses that meet weekly are all ways the district fosters professional development. However, these opportunities do not always ensure

that all teachers will participate in educational technology-focused professional development. As stated in Recommendation One, teachers should be offered diversity in their professional learning opportunities. Therefore, online options, coaching, and content-specific collaborative teams should be made available to teachers. Those teachers who are proficient with technology can take part in online options to further improve their technology integration. When the proficient teachers complete online options, they should be able to have the freedom to opt out of school-based professional development by providing evidence of successful completion of the online option. Teachers who are not proficient with technology can benefit from coaching (Beglau et al., 2011; Desimone & Pak, 2017; Ertmer & Ottenbreit-Leftwich, 2010; Sugar & Van Tryon, 2014) to begin their technology integration journey. In all cases, teachers within the same content-area can collaborate to ensure effective integration of technology and 21st century skills.

Currently, the district offers incentives for teachers to take part in the planning of professional development. I am one of the district professional development facilitators for state adopted standards. Also, each school has multiple TTLs who assist the DIS with assisting teachers with technology integration. The TTLs are involved in the planning for monthly school-based educational technology-focused professional development. These incentives should remain in place.

Recommendation Four calls for the district and school to focus on integrating technology into curriculum, not as a separate initiative. Efforts to seamlessly combine the initiatives should be considered. For example, data teams and state adopted standards are usually organized based on content-area. Would it be prudent to combine these teams

so that the collective expertise of all teachers in a particular content-area work together to analyze student data and plan lessons that integrate 21st century skills all with the help of technology? For example, all U.S. History teachers throughout the district can form a content-based professional development group that develops ways to incorporate technology to increase 21st century skills. Using technology tools purchased by the district, the U.S. History teachers from each school can conduct school-based meetings more often throughout the year to continue planning and determine if students are progressing by analyzing student assessment data.

Moreover, technology integration should be considered across all types of professional development and initiatives within the school and district. While data team meetings seem to be a logical way to track student growth, it does not happen organically in the current model. Content-area groups should not have to follow a rigid data team meeting schedule and fill out paperwork to justify that they have collected or analyzed data. Data analysis should happen as teachers reach a point in a unit that is appropriate (e.g. the beginning, middle, and end of the unit). Data analysis should be organically weaved throughout a unit.

Recommendation Five calls for administration to help teachers implement technology. The school and district already have a technology team in place that serves a vital role in troubleshooting and assisting teachers with technology integration. As noted in all focus group interviews, the DIS and technology team are valued by administrators and teachers. However, the role of the DIS should focus on coaching teachers to help them more effectively integrate technology. For example, Lowther et al. (2008) found that the Tennessee EdTech Launch, which provided full-time technology coaches, had a

positive impact on teachers' technology integration. Also, teachers should have technology modeled for them and participate in content-specific planning time and embedded practice time. This can be accomplished by providing content-specific sessions for teachers to see content-appropriate technology tools modeled and then allowing teachers to practice and collaborate together.

Teacher Agency

While teachers are offered professional development through the school and district, the possibilities for enhancing teachers skills are not solely the responsibility of the school and district. Teachers should exhibit agency for their own professional learning and growth. Teachers can choose to participate in professional development on their own to enhance their instructional practices (Lopes & Cunha, 2017). For example, attending conferences, enrolling and completing graduate-level coursework, learning through MOOCs (Tossell et al., 2015), engaging in webinars, taking part in online professional communities (Tour, 2016), and participating in EdCamps (Carpenter & Linton, 2016) are all types of professional development that can be completed independently.

Implications and Future Research

This research has implications for me, leaders at individual schools, as well as leaders within the district. Two types of implications are considered: (a) personal implications and (b) implications for future research followed by (c) future research.

Personal Implications

As a result of this study, I have learned lessons that will help me as in my role outside of the classroom as a district-level professional development facilitator. These

lessons include: (a) engaging in mixed-methods action research, (b) researching the current literature, and (c) sharing and communicating my findings.

Engaging in mixed-methods action research. Action research provides practitioners a way to uncover counterproductive practices in their context (Mertler, 2009). Triangulation of qualitative data and quantitative data allows researcher-practitioners to enhance the understanding of situations in a local setting (Leech & Onwuegbuzie, 2007). I employed a mixed-methods action research study to make recommendations for educational technology-focused professional development. As a district-level professional development facilitator, my research provided me with a guideline to plan for future professional development that considers the needs and preferences of my group of teachers. However, based on the results of my study, I also plan to incorporate technology tools that enable my colleagues to integrate 21st century skills in their day-to-day lessons. As Mertler (2009) suggests, by triangulating my qualitative and quantitative data, I was able to better understand the needs and preferences of teachers during educational technology-focused professional development.

Researching the current literature. I embrace technology and learn about new technology tools to integrate in my lessons on a daily basis. While I may not be an innovator in terms of Rogers (2001) diffusion of innovation, I am definitely an early adopter of new instructional technology. In my opinion, the current state of educational technology-focused professional development does not meet the needs of all teachers at Lakeside High School. Prior to this research, I also believed that educational technology-focused professional development was inadequate because not all of my colleagues are

proficient with technology, yet they all attend most of the mandatory professional development sessions that I attend.

Research and exploration of the existing literature concerning educational technology and professional development has impacted my opinion of educational technology-focused professional development. The research is clear concerning characteristics of effective educational technology-focused professional development. This study has provided me the opportunity to be more critical of my own opinions and the opinions of others. Whereas the issue of technology integration in education is present at Lakeside High School, it is also abundantly clear that Lakeside High School is not the only site with this issue. Rather than haphazardly suggesting ways to improve educational technology-focused professional development at Lakeside High School, I can use the existing literature to learn what others have already implemented to enhance professional learning that integrates instructional technology.

Sharing and communicating my findings. After all quantitative and qualitative data were collected, I shared my findings with the teacher-participants as a part of member checking. As a district-level professional development facilitator, I am required to include academic reading as a part of my professional development sessions. Therefore, I presented my findings with teachers throughout the district that were a part of my professional development group.

First, my professional development group was presented with the quantitative data of this study. When reviewing the quantitative data, my group of teachers were very receptive to increasing 21st century skills in their classrooms. Next, the group was presented with the teacher-related themes from the qualitative data. They seemed to

agree with teacher-related themes that were developed as a result of the teacher-focus group interviews.

Lastly, I had the teachers in my session read the administrator-related themes in small groups and share the findings with the whole group. This led to a discussion concerning the administrators' perceptions of educational technology-focused professional development. The teachers were not happy to hear all of the themes and categories related to the administrators' perceptions of educational technology-focused professional development. Some teachers even provided reasons why teachers seemed to be inattentive during professional development sessions (e.g., grades are due, lessons need to be planned, etc.).

My professional development group is ready to continue with their professional learning. At the end of the session they were given a district-issued survey to complete. As a part of the survey they were asked to create hashtags to summarize the day spent in professional development. They created many different hashtags that reflect their readiness to learn about integrating technology and 21st century skills into their curriculum (i.e., #EdTechRocks, #timetolearn, #collaboration, and #qualitynotquantity).

I was able to meet with Beverly, our administrator in charge of curriculum to review my findings and recommendations. Beverly said she was shocked to see the results of the survey findings concerning low levels of collaboration. She added that it could possibly be due to the set-up of the classrooms because the desks are not conducive to group work. Beverly also stated that she tries to be creative to provide opportunities to utilize professional development because there is limited time provided by the district.

However, she can only provide a limited amount of extra time for professional development because her “hands are tied.”

Implications for Future Research

This study has implications for leadership at the school- and district-level. Leaders who are responsible for planning and implementing professional development for teachers may be interested in future research related to education technology-focused professional development.

Replicating this study on a larger-scale, perhaps across an entire school district, may allow researchers to extend the understanding of effective educational technology-focused professional development. In a study about the value of replicating other studies (Park, 2004), it was determined that replicating studies either contributes or refutes the findings of the replicated studies.

Quantitative data were collected from a survey that asked questions about 1) Personal Technology Skills, 2) Risk-taking Behaviors and Comfort with Technology, 3) Confidence with Integrating Educational Technology in the Classroom, 4) Perceived Benefits of Technology Use, 5) Beliefs and Behaviors about Classroom Technology Use, 6) Thoughts about Teaching and Learning: Critical Thinking Skills, 7) Thoughts about Teaching and Learning: Collaboration Skills, 8) Thoughts about Teaching and Learning: Communication Skills, 9) Thoughts about Teaching and Learning: Creativity and Innovation Skills, and 10) Thoughts on Educational Technology-focused Professional Development. However, a greater focus should have been made on teacher-participants’ thoughts on professional development. Also, the survey utilized a five-point Likert scale for most responses. There were many items that had means near the neutral scale.

Cummins and Gullone (2000) posit that using a 10-point Likert scale results in a higher degree of reliability.

The purpose of this research was to make recommendations concerning educational technology-focused professional development based on the perceptions of teachers and administrators. Therefore, future research should be done to evaluate the recommendations made in this study.

Limitations

This mixed-methods action research study, as with any other research study, has limitations. Action research is meant to identify problems in or develop solutions for a specific location in order to promote positive change (Mertler, 2017). Therefore, findings from this study should not be generalized beyond my own context. While this study corroborates findings of previous research on educational technology-focused professional development (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2010; Garet et al., 2001), interpretations should be made at the discretion of the reader.

Other limitations of the study are related to the survey instrumentation. As with any survey, there is a potential for the participants to mark random answers if they do not understand, skip over, or suffer from survey fatigue (Coughlin, Cronin, & Ryan, 2009). This can cause results to be inconsistent. I purposefully included prompts that were worded in a positive way and a negative way to ensure reliability of the prompts. However, the number of items could have been fewer in number. In addition, self-reporting may have been an issue (Mertler, 2017) with the findings. A number of the items on the survey asked teacher-participants to gauge their frequency of use for

different pedagogies and technology tools. So, teacher-participants may be over- or under-estimating their uses causing error in the data.

Due to an error in making the survey, the item that focused on the diffusion of innovation had an answer choice that repeated instead of the correct answer choice (see Appendix B). I was able to resend the corrected item in a new form (see Appendix G). The new form consisted of items to collect demographic information and their self-rating for diffusion of innovation. I was able to have a high rate of return on the second form (58%), but the second survey was given after the start of the school year. Therefore, there was a potential for teachers who filled out the first survey to not be represented in the second survey due to retiring or moving schools. Also, new teachers may have filled out the form who did not fill out the original survey.

Lastly, while the rate of participation was favorable (i.e., higher than 50% return on the survey and three teacher-focus groups of three to five participants), the participants did not represent a high percentage of all content-areas. For example, there were only two participants from the physical education and world languages departments who participated in the survey. While the other departments were well-represented, physical education and world languages were not.

Concluding Thoughts

While technology integration has been made possible and available to teachers and students (Ertmer. 1999; Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017), there are still gaps in actual technology integration in classrooms (Ertmer & Ottenbreit-Leftwich, 2010). First- and second-order barriers are still present that impede the effective implementation of instructional technology (Ertmer & Ottenbreit-Leftwich,

2010; Woo, 2016). To assist students in becoming world-class graduates, teachers must effectively integrate technology into lessons that enhance 21st century skills. If teachers are expected to develop their students into world-class graduates, they must participate in meaningful professional development that incorporates instructional technology into sound pedagogy and content-knowledge (Davies & West, 2014; Koehler & Mishra, 2009). By planning for teacher-centered professional development, teachers can learn how to seamlessly integrate technology into their content-specific curriculum and their everyday lesson plans. Although there is a great deal of research on effective professional development, teachers are not always presented with school- or district-based professional development that meets their needs (Diaz-Maggioli, 2004; Desimone & Garet, 2015; Garet et al., 2001). With federal, state, and district mandates, it is difficult to ensure teacher-centered professional development that includes technology integration as a key component. I have made recommendations based on ISTE's essential characteristics for effective professional development that have foundations in research and current literature. These recommendations will enable teachers to participate in meaningful professional learning that will help them to prepare their students to become world-class graduates and be better prepared for life after high school.

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APPENDIX A

EMAIL TO REQUEST PARTICIPATION IN TEACHER SURVEY

Dear colleague,

Thank you for considering participation in this study. I am Lori Latham. I am a completing research for the Curriculum and Instruction, with emphasis in educational technology, educational doctorate program at the University of South Carolina. This study will fulfill my degree requirements. I would like to invite you to participate in this study to collect information that may be used to recommend ways to improve your educational technology-focused professional development experience.

This study will utilize a survey to collect quantitative information regarding four key aspects of educational technology integration in the classroom. The four key aspects in the survey include: your evaluation of your personal technology skills, your thoughts on technology integration in the classroom, your thoughts about teaching and learning, and your thoughts on educational technology professional development. The survey will also include a personal information section to ascertain the characteristics of the survey participants.

Participation is anonymous, which means that no one (not even the researcher) will know what your answers are. To ensure anonymity, your name and email address is not included in the personal information section of the survey.

Your participation is valuable and appreciated. However, understand that your participation is strictly voluntary. You are under no obligation to participate and there are no negative consequences if you withdraw yourself from the study.

I will be happy to answer any questions that you have about the study. You may contact me at _____@gmail.com or. You can also contact my faculty advisor, Dr. Michael Grant, _____@sc.edu. If you would like to participate, please click on the link provided to begin answering the survey questions. It will take approximately 10 minutes to complete the survey. There is nothing else you need to do when you finish answering the survey questions.

With kind regards,
Lori Latham

APPENDIX B

TEACHER SURVEY

Survey of Teachers' Needs and Preferences for Educational Technology-focused Professional Development

* Required

Introduction to Study and Consent

Thank you for considering participation in this study. I am Lori Latham. I am a completing research for the Curriculum and Instruction, with emphasis in educational technology, educational doctorate program at the University of South Carolina. This study will fulfill my degree requirements. I would like to invite you to participate in this study to collect information that may be used to recommend ways to improve your educational technology-focused professional development experience.

This study will utilize a survey to collect quantitative information regarding four key aspects of educational technology integration in the classroom. The four key aspects in the survey include: your evaluation of your personal technology skills, your thoughts on technology integration in the classroom, your thoughts about teaching and learning, and your thoughts on educational technology professional development. The survey will also include a personal information section to ascertain the characteristics of the survey participants.

Participation is anonymous, which means that no one (not even the researcher) will know what your answers are. To ensure anonymity, your name and email address is not included in the personal information section of the survey.

Your participation is valuable and appreciated. However, understand that your participation is strictly voluntary. You are under no obligation to participate and there are no negative consequences if you withdraw yourself from the study.

I will be happy to answer any questions that you have about the study. You may contact me at [REDACTED] or [REDACTED]. You can also contact my faculty advisor, Dr. Michael Grant. If you would like to participate, please click next to begin answering the survey questions. It will take approximately 10 minutes to complete the survey. There is nothing else you need to do when you finish answering the survey questions.

With kind regards,
Lori Latham



Personal Information

1. Gender Identification *

Mark only one oval.

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

2. Number of years teaching, not including this school year (if you are in your first year of teaching, please enter zero) *

3. Subject Area (you may select more than one) *

Check all that apply.

- ☐ Career and Technical Education
- ☐ English/Language Arts
- ☐ Math
- ☐ Physical Education or ROTC
- ☐ Science
- ☐ Social Studies
- ☐ Support (Special Services, Media Specialist, Guidance, Speech, etc.)
- ☐ Visual or Performing Arts
- ☐ World Languages
- ☐ Other: _____

Personal Technology Skills

4. Using the scale provided, please rate your own technology skills. *

Mark only one oval per row.

	Learner: I am not sure how to do this task.	Basic: I have done this before, but might need some help.	Proficient: I can perform this task without any assistance.	Advanced: I could train staff to do this.
Create a functioning web page	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take and edit digital pictures on my device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take and edit digital video on my device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Download digital images and videos from my device to my computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyze data and create graphs in Microsoft Excel/Google Sheets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Using the scale provided, please rate your own technology skills. *

Mark only one oval per row.

	Learner: I am not sure how to do this task.	Basic: I have done this before, but might need some help.	Proficient: I can perform this task without any assistance.	Advanced: I could train staff to do this.
Create slide presentations using Powerpoint or Google Slides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Embed video into my presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create a Word Document or Google Doc	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Save files using different file extensions (i.e. save a Word document as a PDF)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Find lessons on the web	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Using the scale provided, please rate your own technology skills. *

Mark only one oval per row.

	Learner: I am not sure how to do this task.	Basic: I have done this before, but might need some help.	Proficient: I can perform this task without any assistance.	Advanced: I could train staff to do this.
Create classes and utilize Google Classroom for productivity and instruction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Share Google Docs, Slides, or Sheets with different user rights (view only, edit, make comments)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create forms and assessments using Google Forms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Troubleshoot issues with your device or student devices in the classroom (i.e., apps freezing up, loss of connection, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use Apple Classroom/Hapara to monitor and control my student iPads/Chromebooks (will change on individual instruments)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Personal Technology Skills (Continued)

7. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal technology skills. *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel comfortable about my ability to work with digital technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning new technologies is confusing for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get anxious when using new technologies because I don't know what to do if something goes wrong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident with my ability to troubleshoot when problems arise while using technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get anxious when using technology with my students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal technology skills. *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I get excited when I am able to show my students a new technology application or tool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident in trying to learn new technologies on my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy finding new ways that my students and I can use technology in the classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning new technologies that I can use in the classroom is important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thoughts About Technology Integration

9. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal thoughts on technology use in the classroom. *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel confident in my ability to integrate multiple technologies into my instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Integrating technology is pertinent to my curriculum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a good variety of ideas and lessons for integrating technology into my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount of time needed to prepare technology-based lessons deters me from creating them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that integrating technology into my curriculum is important for student success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal thoughts on technology use in the classroom.

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I have the technology skills necessary to support the students when they use technology for a project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get excited about using new technology in the classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy attending technology-based Professional Development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want to use technology but am not given enough time to learn it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want to use technology but have not been trained on how to use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thoughts About Technology Integration (Continued)

11. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal thoughts on technology use in the classroom.

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Most of my technology learning has been self-taught and on my own time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using technology to communicate with others allows me to be more effective in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital technology allows me to create materials that enhance my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital technologies help me be better organized in my classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology can be an effective learning tool for students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal thoughts on technology use in the classroom.

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My students get excited when they use technology in the learning process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching students how to use technology is a part of my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using technology in the classroom is a priority for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When planning instruction, I think about how technology could be used to enhance student learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When planning instruction, I consider state and national technology standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I regularly plan learning activities/lessons in which students use technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to model effective technology use for my students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thoughts About Technology Integration (Continued)

13. Which of the following five descriptions best reflects your overall view as it relates to integrating technology into your classroom? Please read all statements carefully to find the best fit for you. *

Mark only one oval.

- ☐ I am comfortable with my current use of technology. I use what has always worked for me and my students. I will adopt a new technology only if I know it will not fail on me. Technology is always changing. I do not want to have to constantly relearn the newest fad.
- ☐ I am often asked for advice concerning technology integration from my colleagues. I am in a leadership role and/or have been asked to assist others in my school and/or district in implementing new technologies in the classroom. I may not be apt to adopting the newest technology, but I am respected and my expertise is valued when I implement new technology.
- ☐ I adopt the use of new technology before the average educator. I frequently interact with my peers, but do not necessarily hold a leadership position. I deliberate for some time prior to adopting a new technology. I don't want to be the first to adopt new technology, but I certainly do not want to be the last.
- ☐ I am often asked for advice concerning technology integration from my colleagues. I am in a leadership role and/or have been asked to assist others in my school and/or district in implementing new technologies in the classroom. I may not be apt to adopting the newest technology, but I am respected and my expertise is valued when I implement new technology.
- ☐ I am at the forefront of technology utilization in the classroom. If I see new, cutting-edge technologies that may benefit my students from my social media groups, I will venture into the unknown and test out the technology with my students. I am comfortable with a high degree of uncertainty and do not feel the need to defend my integration of technology with my colleagues or administration.

14. How often do you have your students participate in the following activities in class? *

Mark only one oval per row.

	Almost Never	A Few Times a Semester	1-3 Times per Month	1-3 Times per week	Almost Daily
Compare information from different sources before completing a task or assignment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Draw their own conclusions based on analysis of numbers, facts, or relevant information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Summarize or create their own interpretation of what they have read or been taught.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyze competing arguments, perspectives, or solutions to a problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a persuasive argument based on supporting evidence or reasoning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. How often do you have your students participate in the following activities in class? *

Mark only one oval per row.

	Almost Never	A Few Times a Semester	1-3 Times per Month	1-3 Times per week	Almost Daily
Try to solve complex problems or answer questions that have no single correct solution or answer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work in pairs or small groups to complete a task together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work with other students to set goals and create a plan for their team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create joint products using contributions from each student.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Present their group work to the class, teacher, or others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thoughts About Teaching and Learning (Continued)

16. How often do you have your students participate in the following activities in class? *

Mark only one oval per row.

	Almost Never	A Few Times a Semester	1-3 Times per Month	1-3 Times per week	Almost Daily
Work as a team to incorporate feedback on group tasks or products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give feedback to peers or assess other students' work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Structure data for use in written products or oral presentations (e.g. creating charts, tables, or graphs).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convey their ideas using media other than a written paper (e.g. posters, video, blogs, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prepare and deliver an oral presentation to the teacher or others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. How often do you have your students participate in the following activities in class? *

Mark only one oval per row.

	Almost Never	A Few Times a Semester	1-3 Times per Month	1-3 Times per week	Almost Daily
Answer questions in front of an audience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decide how they will present their work or demonstrate learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use idea creation techniques such as brainstorming or concept mapping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generate their own ideas about how to confront a problem or question.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Test out different ideas and work to improve them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Invent a solution to a complex, open-ended question or problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create an original product or performance to express their ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thoughts About Technology Professional Development

18. Using the scale provided, please indicate how strongly you agree or disagree with the following statements about your own personal thoughts on any technology professional development you have been offered and/or participated in. *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Technology professional development workshops often help teachers to develop new teaching techniques.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I did not have to attend technology inservice workshops, I would not.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology professional development events are worth the time they take.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been enriched by the teacher technology training events I have attended.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology staff development initiatives have not had much impact on my teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technology professional development I have received could be easily applied in my classroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel adequately trained on the skills needed to use technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have enough opportunity to share technology lessons with other teachers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX C

EMAIL TO TEACHERS FOR FOCUS GROUP INTERVIEW

Dear colleague,

My name is Lori Latham. I am a doctoral candidate in the Education Department at the University of South Carolina in Curriculum and Instruction with a concentration in Educational Technology, and I would like to invite you to participate.

I am studying teachers' needs and preferences for educational technology-focused professional development. If you decide to participate, you will be asked to participate in a group discussion about your experiences, needs, and preferences for professional development that focuses on the use of educational technology in the classroom.

You may feel uncomfortable answering some of the questions. You do not have to answer any questions that you do not wish to answer. The meeting will take place at a mutually agreed upon time and place, and should last about 30-60 minutes. The interview will be audio recorded so that I can accurately transcribe what is discussed. The tapes will only be reviewed by me and destroyed upon completion of the study.

Participation is confidential. Study information will be kept in a secure location at the University of South Carolina. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Others in the group will hear what you say, and it is possible that they could tell someone else. Because we will be talking in a group, we cannot promise that what you say will remain completely private, but we will ask that you and all other group members respect the privacy of everyone in the group.

I will be happy to answer any questions you have about the study. You may contact my faculty advisor, Dr. Michael Grant or me.

Thank you for your consideration. If you would like to participate, please respond to this email to indicate that you are interested in participating.

With kind regards,

APPENDIX D

TEACHER FOCUS GROUP INTERVIEW PROTOCOL

Introductory script

To facilitate my note-taking, this discussion will be audio-recorded. Only I will have access to this recording, and once I have transcribed it, it will be destroyed. Your responses will remain confidential, and in the transcription and any future published information, your names will be changed for your privacy. In addition, your participation in this conversation is voluntary, and you may choose not to answer any of the questions and/or stop participation at any point. This interview should last approximately 30 minutes. In the interest of time, it may be necessary to interrupt you in order to move ahead with all of the questions I have planned. Does anyone have any questions?

I am interested in learning about teachers' needs and preferences for educational technology-focused professional development. "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008, p.1). You were selected to participate in this conversation because I felt that you would give honest, articulate answers and provide information that would be representative of your colleagues in general. Please understand that my purpose in this conversation is not to judge you or your experiences as positive, negative, right, or wrong. I am simply trying to learn more about the needs and preferences for educational technology-focused professional development.

The following list of questions was used as an outline for the focus group questions.

Where appropriate, the interviewees were asked to expand upon their answers.

1. How do you currently utilize technology in your classroom?
2. Tell me about a time when you experienced difficulties when integrating technology in your classroom and/or curriculum?
3. Give an example (or more) a time when you felt supported by your school so that you could integrate technology into your daily instruction for teaching and learning?
- d. Discuss some of the professional development you have participated in that focus on the use of technology in the classroom (i.e., workshop, college courses, seminars, etc.) If the answer is no, proceed to 4d.

- a. How often do you attend technology-based professional development?
 - b. What do you like the most about the professional development sessions?
 - c. What do you like the least about the professional development sessions?
 - d. Why have you not participated in a professional development?
- e. How has technology-based professional development helped with the implementation of technology into your daily classroom instruction?
- a. Give an example of a strategy or strategies you have learned in your technology-focused professional development that you have used or would like to use in your classroom.
 - b. How do you feel about the time allocated for teachers to practice the implementation of strategies learned from technology-based PD sessions?
 - c. How do you feel about the time allocated to consult with their peers concerning integrating technology into their curriculum?
6. In general, how do you feel about your competency and comfort level once you have completed a technology-based professional development session?
7. What changes (if any) would you like to see to help you better integrate technology into your curriculum?
8. Describe your ideal technology-based professional development session. What makes it ideal?

Adapted from:

Byrd, N. (2017). *Technology-based professional development for teaching and learning in K-12 classrooms* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 10622029)

APPENDIX E

EMAIL TO ADMINISTRATORS FOR FOCUS GROUP INTERVIEW

Dear administrator,

My name is Lori Latham. I am a doctoral candidate in the Education Department at the University of South Carolina. I am conducting a research study as part of the requirements of my degree in Curriculum and Instruction with a concentration in Educational Technology, and I would like to invite you to participate.

I am studying teachers' needs and preferences for educational technology-focused professional development. If you decide to participate, you will be asked to participate in a group discussion about your perceptions of teachers', needs, and preferences for professional development that focuses on the use of educational technology in the classroom.

You may feel uncomfortable answering some of the questions. You do not have to answer any questions that you do not wish to answer. The meeting will take place at a mutually agreed upon time and place and should last about 30-60 minutes. The interview will be audio recorded so that I can accurately transcribe what is discussed. The tapes will only be reviewed by me and destroyed upon completion of the study.

Participation is confidential. Study information will be kept in a secure location at the University of South Carolina. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Others in the group will hear what you say, and it is possible that they could tell someone else. Because we will be talking in a group, we cannot promise that what you say will remain completely private, but we will ask that you and all other group members respect the privacy of everyone in the group.

I will be happy to answer any questions you have about the study. You may contact my faculty advisor, Dr. Michael Grant or me.

Thank you for your consideration. If you would like to participate, please respond to this email to indicate that you are interested in participating.

With kind regards,

APPENDIX F

ADMINISTRATOR FOCUS GROUP INTERVIEW PROTOCOL

Introductory script

To facilitate my note-taking, this discussion will be audio-recorded. Only I will have access to this recording, and once I have transcribed it, it will be destroyed. Your responses will remain confidential, and in the transcription and any future published information, your names will be changed for your privacy. In addition, your participation in this conversation is voluntary, and you may choose not to answer any of the questions and/or stop participation at any point. This interview should last approximately 30 minutes. In the interest of time, it may be necessary to interrupt you in order to move ahead with all of the questions I have planned. Does anyone have any questions?

I am interested in learning about teachers' needs and preferences for educational technology-focused professional development. "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008, p.1). You were selected to participate in this conversation because I felt that you would give honest, articulate answers and provide information that would be representative of your colleagues in general. Please understand that my purpose in this conversation is not to judge you or your experiences as positive, negative, right, or wrong. I am simply trying to learn more about the needs and preferences for educational technology-focused professional development.

The following list of questions was used as an outline for the focus group questions. Where appropriate, the interviewees were asked to expand upon their answers.

1. For what purpose or goal should teachers use technology in their classrooms?
2. What difficulties have you encountered as teachers try to integrate technology in their curriculum?
3. How does your school support teachers with integrating technology into their daily instruction for teaching and learning?
 - a. Please discuss a time when supports enabled a teacher (or teachers) to successfully implement a technology-based strategy in their classroom.
 - b. Please discuss a time(s) when supports were not successful and prohibited a teacher (or teachers) to successfully implement one or more technology-based strategy(ies) in their classroom.

4. Describe how teachers are able to participate in professional development that focuses on the use of technology in the classroom?
 - a. How often are they able to attend technology-based professional development?
 - b. What do you like the most about the professional development sessions?
 - c. What do you like the least about the professional development sessions?
 - d. Why do you think teachers choose not to participate in professional development focused on technology?
5. How do you feel about the time allocated for teachers to:
 - a. Practice the implementation of strategies learned from technology-based PD sessions?
 - b. Consult with their peers concerning integrating technology into their curriculum?
6. How has technology-based professional development helped with the implementation of technology into daily classroom instruction?
7. In general, how do you feel about the competency and comfort level of your teachers once they have completed a technology-based professional development session?
8. What changes (if any) would you like to see to help teachers better integrate technology into the curriculum?
9. Describe the ideal technology-based professional development session. What makes it ideal?

Adapted from:

Byrd, N. (2017). *Technology-based professional development for teaching and learning*

in K-12 classrooms (Doctoral dissertation). Retrieved from ProQuest

Dissertations and Theses database. (UMI No. 10622029)

APPENDIX G

UPDATED TEACHER SURVEY WITH CORRECT DIFFUSION OF INNOVATION ITEM

Teachers' Needs and Preferences for Educational Technology-focused Professional Development

Please fill out this form so that I can collect data to make recommendations for future educational technology-focused professional development.

* Required

Introduction to Study and Consent

Dear colleague,

Thank you for considering participation in this study. I am Lori Latham. I am completing research for the Curriculum and Instruction, with an emphasis in educational technology, educational doctorate program at the University of South Carolina. This study will fulfill my degree requirements. I would like to invite you to participate in this study to collect information that may be used to recommend ways to improve your educational technology-focused professional development experience.

This study will utilize a survey to collect quantitative information regarding four key aspects of educational technology integration in the classroom. The four key aspects in the survey include your evaluation of your personal technology skills, your thoughts on technology integration in the classroom, your thoughts about teaching and learning, and your thoughts on educational technology professional development. The survey will also include a personal information section to ascertain the characteristics of the survey participants.

Participation is anonymous, which means that no one (not even the researcher) will know what your answers are. To ensure anonymity, your name and email address are not included in the personal information section of the survey.

Your participation is valuable and appreciated. However, understand that your participation is strictly voluntary. You are under no obligation to participate and there are no negative consequences if you withdraw yourself from the study.

I will be happy to answer any questions that you have about the study. You may contact me at [REDACTED] or [REDACTED]. You can also contact my faculty advisor, Dr. Michael Grant, [REDACTED]. If you would like to participate, please click on the link provided to begin answering the survey questions. It will take approximately 10 minutes to complete the survey. There is nothing else you need to do when you finish answering the survey questions.

With kind regards,
Lori Latham



Personal Information

1. Gender Identification *

Mark only one oval.

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

2. Number of years teaching, not including this school year (if you are in your first year of teaching, please enter zero) *

3. Subject Area (you may select more than one) *

Check all that apply.

- ☐ Career and Technical Education
- ☐ English/Language Arts
- ☐ Math
- ☐ Physical Education or ROTC
- ☐ Science
- ☐ Social Studies
- ☐ Support (Special Services, Media Specialist, Guidance, Speech, etc.)
- ☐ Visual or Performing Arts
- ☐ World Languages

Other: ☐ _____

Thoughts About Technology Integration

4. Which of the following five descriptions best reflects your overall view as it relates to integrating technology into your classroom? Please read all statements carefully to find the best fit for you. *

Mark only one oval.

- ☐ I am comfortable with my current use of technology. I use what has always worked for me and my students. I will adopt a new technology only if I know it will not fail on me. Technology is always changing, I do not want to have to constantly relearn the newest fad.
- ☐ I will use technology in my classroom due to increasing pressures from my colleagues and/or administration. I am skeptical of new technology and do not adopt new technology until I know that it will work for me and my students in my classroom.
- ☐ I adopt the use of new technology before the average educator. I frequently interact with my peers, but do not necessarily hold a leadership position. I deliberate for some time prior to adopting a new technology. I don't want to be the first to adopt new technology, but I certainly do not want to be the last.
- ☐ I am often asked for advice concerning technology integration from my colleagues. I am in a leadership role and/or have been asked to assist others in my school and/or district in implementing new technologies in the classroom. I may not be apt to adopting the newest technology, but I am respected and my expertise is valued when I implement new technology.
- ☐ I am at the forefront of technology utilization in the classroom. If I see new, cutting-edge technologies that may benefit my students from my social media groups, I will venture into the unknown and test out the technology with my students. I am comfortable with a high degree of uncertainty and do not feel the need to defend my integration of technology with my colleagues or administration.