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Understanding Western Pacific Teachers' Perceptions and Experiences Implementing Technology in the Classroom

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Walden University

College of Education

This is to certify that the doctoral study by

Roque Castro Indalecio

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

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Walden University
2021

Abstract

Understanding Western Pacific Teachers' Perceptions and Experiences Implementing Technology in the Classroom

by

Roque Castro Indalecio

MEd, Concordia University, 2014

BS, Northern Marianas College, 2012

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

December 2021

Abstract

At a Western Pacific Region school district with six public high schools, district administrators implemented an educational technology training program (ETTP) to improve technology integration in the classroom as measured by the Effective Learning Environments Observation Tool, but there was no follow-up to determine how the teachers perceived the ETTP and to identify the experiences of teachers related to instructional technology after taking the district training. This basic qualitative study, guided by the technology acceptance model, addressed this problem in the district by exploring how the teachers perceived the technology professional development program provided by the district and the teachers' experiences related to instructional technology after taking the district training. The purposeful sample included 13 Western Pacific Region high school teachers who were interviewed via Zoom. Data were analyzed using thematic analysis to create codes, categories, and themes. The participants perceived the ETTP as helpful because they learned new tools and increased their confidence in using technology in their classrooms. Results showed that after completing the ETTP, teachers still needed content-specific technology training and continuous professional development, informing the decision to design a 3-day science professional development for the project study. High school teachers expressed the need for these trainings to continue integrating technology using up-to-date technology tools. Rethinking science professional development is one potential form of social change. Additionally, the 3-day professional development may promote social change through preparing science teachers with the technological skills and knowledge needed to drive their lessons.

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Dedication

I dedicate this study to my parents, Maria Pangelinan Castro and Pedro Hocog Indalecio. Mom, thank you for instilling in me the value of education, hard work, and perseverance. Thank you for always being our rock when things got hard. The challenges you faced and the sacrifices you made to ensure our lives were stable are not in vain. Hu guaiya håo nåna-hu.

To the most brilliant and selfless vice-principal, Melanie Sablan Rdiall, thank you for your guidance and support. You have been supportive since the advent of my study. I am where I am because of your words of wisdom and encouragement. I am forever grateful for that. I aspire to be a leader like you one day. You are the MVP.

To my cousins, Nina Hocog Manglona and Esco Hocog Ulloa, I am thankful for your constant reminders that change has to happen for things to get better. I want you to know that whenever you decide to pursue your doctorate, I will be there cheering you on until the finish line.

To my good friends Fatima Manaloto, Daisy Villagomez-Bier, and Stephanie Sablan. Thank you for always ensuring that I get things done and always cheering me on as I pursue my doctoral journey. Thank you for constantly feeding me and reminding me that everything will be worth it in the end.

To my students then and now, thank you for making me the educator I am today. Your patience, words of inspiration, and the lessons I learned from all of you is the reason why I love what I do. Thank you for always visiting me and reminding me that what I do is important.

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I want to thank my committee members for all that hard work you have put into my study. Dr. Tyrrell, thank you for all your valuable feedback. I am forever thankful for your patience and guidance. Since the beginning, you have always ensured that I achieved all my goals throughout the term and look at where we are; I am a doctor. You have not only been a chairperson but a mentor and a teacher. To Dr. Aguilar, thank you for all your valuable feedback. To Dr. Pederson, thank you for guiding me through the initial stages of the capstone. Finally, thank you, Dr. Williams, for being my URR and for your feedback. Your feedback allowed my drafts to transpire into a study.

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Section 1: The Problem

Technology has become ubiquitous in all job areas, including education. People are living in an era where technology is rapidly changing, and new forms of information and communication technologies are being introduced; technology has now influenced the education system, making it essential for schools to adapt to the digital world (Akcil et al., 2019). In 2012, a public school district in the Western Pacific Region created a 5-week educational technology training program (ETTP) for teachers that has continued to grow, with the ninth cohort of teachers starting in November 2020. The district also showed an upward trend in the use of technology in the classroom by teachers and learners as measured by the Effective Learning Environments Observation Tool. The problem is that the district administrators implemented the ETTP to improve technology integration in the classroom as measured by the ELEOT, but there was no follow up to determine how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. According to the technology director, data from the ETTP for teachers included users' comments about the informal impact of the program and completion data after completing the course. From these data, it is unknown whether the ETTP for teachers is achieving its goal of helping teachers to integrate and incorporate technology and digital tools to enhance teaching and learning.

Additionally, according to a schoolwide announcement in October 2020, the program was put in place to "bridge the gap between teachers' knowledge and the current skills that are essential for 21st-century teaching and learning". The training program

provided educators with access to high-quality digital tools to implement in the classroom to enhance learning. Furthermore, the courses were meant to help teachers use different digital tools in their classrooms. In addition to gaining access to digital tools, teachers were trained to use and implement technology to enhance their lessons.

According to a professional development announcement from the district, the ETTP for teachers offers five hybrid courses (online and face-to-face requirements) to complete the program. Each class runs for a total of 45 hours. The courses offered to teachers are Classroom Instruction that Works with Technology, Advanced Computer Applications, Google Apps for Education, Student Tech Products, and Digital Citizenship in Schools. Additional requirements include an educational technology professional development in-service, integration of educational technology in regular lesson planning, and teachers attending face-to-face sessions once a week. Since 2012, 784 teachers participated in the 5-week technology training program, and 163 were high school teachers.

Harrell and Bynum (2018) and Dean and East (2019) emphasized that it is the schools' responsibility to incorporate technology into the classroom to equip students with 21st-century skills to be college and career ready. A global economy is a competitive place where technology is an important skill needed in the workplace (Harrell & Bynum, 2018). Students who are more likely to be equipped with technological skills have a higher chance of landing a job and excelling in it (Dean & East, 2019; Harrell & Bynum, 2018). Additionally, a study conducted by Zhai et al. (2019) found that higher use and integration of mobile technology in the classroom

resulted in a positive correlation with student achievement. Therefore, teachers must incorporate technology into the curriculum to allow students to hone such skills to be self-sufficient and productive citizens in the global economy (Harrell & Bynum, 2018). Furthermore, Gil-Flores et al. (2017) explained that technology can help students acquire essential skills such as evaluating, producing, presenting, and exchanging information. Because such skills are important for the global economy, technology is also a necessary tool for learning, accessing information, and supporting content.

Rationale

The purpose of this basic qualitative study was to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. Teachers are encouraged to complete the technology training program, but little is known about how teachers perceived the usefulness of the program. The program prepares teachers with the technological skills needed to instruct 21st-century learners. The ETTP was funded by the Territories and Freely Associated States Education Grant Program (T&FASEG). The program goals were to

- strengthen instructional technology by recruiting teachers and administrative leaders to complete the program,
- improve student achievement by training teachers to implement high-quality digital tools in their classrooms effectively, and

- ensure that all participants would demonstrate at least 50% of the instructional technology applications in their workplace as measured by the Power Walkthrough Assessment.

Because there were no other data to show application, and it was unknown whether the program was achieving its goals, this research explored teacher perceptions of the ETTP. There was a need for an increased understanding of how teachers implemented technology after completing the training program because teachers must prepare learners for the 21st-century workforce. Furthermore, an understanding can be used by the office of instructional technology to evaluate whether its program is preparing teachers to integrate technology in their classroom and to understand how teachers perceived the effectiveness of the courses offered.

Definition of Terms

21st-century skills: A set of skills such as "life and career skills; learning and innovation skills; and information, media, and technology skills" needed to be college and career ready (Vasil, 2020, p. 46).

Digital literacy: "A set of knowledge and abilities possessed by individuals in understanding, evaluating, and using information obtained by prioritizing ethics in order to communicate and interact in daily life" (Saputra & Al Siddiq, 2020, p. 159).

Priority standards: A selected subset of content-specific standards from each content area that high school students must know after completing their science courses (Ainsworth, 2003).

Professional development: The process of improving teachers' knowledge and skills needed for professional growth (El Shaban & Egbert, 2018; Greene & Jones, 2020).

Student performance: "Achieving personal objectives" (Conijn et al., 2018, p. 616).

Technology integration: The use of technology in K-12 classrooms to support and strengthen instructional methods (Liu et al., 2017).

Technology training: Support made available for teachers to ensure that technology is implemented in everyday teaching (Williams, 2017).

Significance of the Study

Through technology, teachers can prepare students with the skills they need to be college and career ready. Such skills include communication skills, creativity, collaboration, problem solving, and digital literacy. These skills are necessary for students to succeed in achieving degrees and maintaining a job (Dean & East, 2019).

The findings from this study may be significant to all stakeholders, including students, parents, teachers, and administrators. The results of this study could impact the way students learn and receive information. Additionally, students can benefit from attaining new skills needed to be competent if they choose to pursue higher education or join the workforce. For parents, this study may help them be informed of best practices relating to technology that can be reinforced at home. Parents can also receive proper training that could help their children succeed in their academics. This study is significant to high school teachers because it could lead to more future training programs that can assist teachers in incorporating relevant technological tools in the classroom to drive

instruction. Not only is it important for high school teachers, but it is also applicable for all teachers in the district, as it can provide them with proper and relevant training to stay abreast of new technology that can enhance and drive classroom instructions. District administrators may benefit from the findings if the study shows both positive and negative perceptions of the program. The positive perceptions of the program have implications for improving the learning environment and student outcomes. The negative perceptions can help district administrators find areas in which to improve the training program. The students served by the teachers may benefit from the findings of this study if their teachers are able to train them with the skills they need for the 21st-century through the use of a variety of technological tools.

This study is unique because little research has been done in the Western Pacific Region School District about technology. Additionally, this study is unique because, 8 years since its implementation, the district has upgraded the ETTP but still has few research results about its impact. My project study was the first to explore teachers' perception of the ETTP and teachers' experiences after taking the district training.

This study may bring forth social change within the school district as a whole, as it may prepare teachers with the skills and knowledge needed to drive their lessons. Furthermore, with the implementation of technology provided by the district, teachers can better serve students with up-to-date research-based strategies involving technology that can help students excel and, more importantly, help them become college and career ready. The more that is understood about the program and what areas need improvement, the more quickly solutions may be found that benefit all stakeholders, especially teachers

and students. When technology is used to enhance the lessons in the classroom, students learn new skills that they will apply in the real world, such as collaboration, creativity, critical thinking, and problem solving. When teachers are equipped with tools, knowledge, and skills, they can better serve their students by making sound decisions about best practices and methods for using technology effectively to promote and nurture learning in the classroom (Lee, 2018). When teachers better serve students, there may be improvement in all aspects of the students, including academics and behavior.

Research Questions

The purpose of this basic qualitative study was to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. The following questions served as a guide for this research:

RQ1: How do teachers perceive the technology professional development program provided by the district?

RQ2: What are the experiences of teachers related to instructional technology after taking the district training?

Review of the Literature

The literature reviewed in this section focused on four aspects relating to teacher use of technology in the classroom to drive instruction. One part focused on integrating technology in the classroom and how technology can empower students with the 21st-century skills they need to be college and career ready. The second aspect focused on professional development and technology training for teachers. The third aspect focused

on the barriers that may hinder teachers from using technology in the classroom to support learning. Finally, the last element centered on the benefits of integrating and using technology in the classroom to drive instruction.

The literature found in this section was gathered using Walden University's online library. Additional relevant articles came from ProQuest, Educational Resource Information Center, Google Scholar, and Sage Publications. To find relevant publications relating to this study, the key terms used to narrow the search included *technology*, *integrating technology*, *technology training for teachers*, *barriers to technology*, *21st-century skills*, *benefits of technology in the classroom*, *teacher perceptions*, and *technology professional development for teachers*.

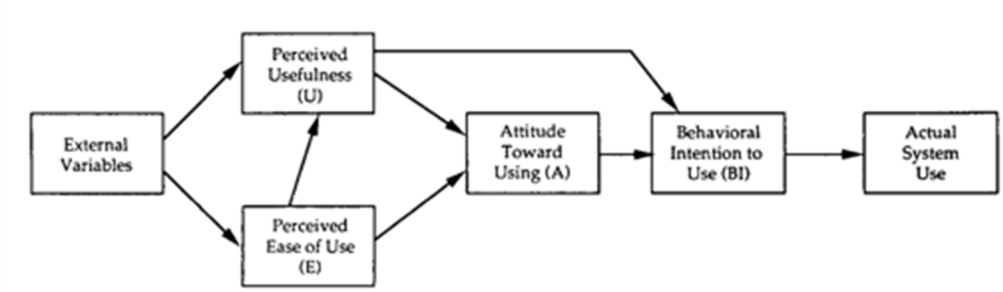
Technology Acceptance Model

The conceptual framework for this study was the technology acceptance model (TAM) developed by Davis (1989). According to Davis, the TAM focuses on two constructs, perceived usefulness and perceived ease of use. These two constructs are the foundation of determining system use (Davis, 1989). The theory may be used to predict the likelihood of an individual or organization adopting technology successfully (Dziak, 2017). Many variables influence the use of technology. One variable is the belief that the application or technology will help users perform better at their jobs. This is called perceived usefulness (Davis, 1989). The second variable is perceived ease of use (Davis, 1989). Though the user may see the technology or application as useful or beneficial, if the technology or application is complicated, or more effort is needed to learn how to use it, the user is more than likely to reject the technology or application. Perceived

usefulness and perceived ease of use are two factors that influence the user's behavior and attitude.

Figure 1

Technology Acceptance Model



Note. This model is used to measure users' adoption of new technology based on their attitudes. The two constructs are perceived usefulness and perceived ease of use. Adapted from "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," by F. Davis, R. Bagozzi, and P. Warshaw, 1989, *Management Science*, *35*(8), p. 985 (https://doi.org/10.1287/mnsc.35.8.982). Copyright 1989 by the Institute for Operations Research and Management Sciences. Adapted with permission.

Figure 1 shows that the two constructs are separate because it allows researchers to trace the effect of external variables such as device function, user features, and ultimate behavior (Davis et al., 1989, p. 988). According to Davis et al. (1989), perceived usefulness "is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (p. 985). Additionally, perceived usefulness focuses on whether or not users believe that using technology can increase the efficiency of their work, making this aspect crucial to the acceptance of technology (Monacis et al., 2019). Davis et al. also

emphasized that perceived usefulness directly affects behavior, determining if the user will use technology to increase their efficiency, despite their attitude toward technology.

In contrast to perceived usefulness, Monacis et al. (2019) explained that perceived ease of use shows how effortless the use of technology feels for the user. If the level of perceived ease of use is higher, the tendency to adopt technology will also be higher, and the other way around will also be accurate. When the user views the technology as difficult to use, the user will be less likely to accept the technology. The model is used to respond to users who have an unfavorable attitude toward technology (Dziak, 2017). Furthermore, some people avoid using technology because they see it as challenging to implement and use appropriately (Dziak, 2017). The purpose of the research was to explore teacher perceptions from the Western Pacific Region on how the ETTP for teachers influenced their classroom instruction. The TAM has two constructs that affect attitude and behavior. This framework was relevant to this study because it focused on teacher perceptions of teachers' educational training. It is unknown whether the training has influenced teachers to incorporate and use technology. This study is important to understand teachers' perceptions and experiences of the training program. Furthermore, by understanding perceptions of the program, program developers can make modifications to meet teachers' needs.

Technology Integration

According to Kalonde (2017b), millions of dollars were spent to ensure that school districts in America were able to access technology. In 1996, President Clinton asked Congress to support his initiative called the Technology Literacy Challenge to

ensure that every classroom in the nation was equipped with the proper technology and trained to use technology. This initiative aims to provide technologically literate students by the end of the 21st-century (U.S. Department of Education, n.d.-b).

In 2001, President George W. Bush pushed for a new education reform called the No Child Left Behind (NCLB) Act. The NCLB Act was created to improve student achievement. This mandate was to improve the Elementary and Secondary Education Act (ESEA) created in 1965 by President Lyndon B. Johnson (U.S. Department of Education, n.d.-c). Under the NCLB, a program called the Enhancing Education Through Technology Act of 2001was created to improve student achievement by using technology in elementary and secondary schools (U.S. Department of Education, n.d.-e).

After the Bush administration, President Obama introduced a new education law called the Every Student Succeeds Act (ESSA) in 2015 (U.S. Department of Education, n.d.-a). This law was also created to improve both the ESEA and NCLB Acts. The sole purpose of the federal law was to prepare every child in America so that when they graduate from high school, they are college and career ready (U.S. Department of Education, n.d.-a). Under the ESSA, several programs were established to help meet the overall goal of this federal mandate. The ESSA has eight titles, each containing several parts and subparts; however, the ESSA focuses on 21st-century schools under Title IV. The first part of the program looked into student supports and academic grants aimed to improve academic achievement and digital literacy for all students using technology (U.S. Department of Education, n.d.-g). Through this program, each state will receive funds to support technology integration in the classroom. Each state is responsible for

developing research and evidence-based strategies to deliver specialized and rigorous instructions through the use of technology, which includes blended learning, digital learning, and assistive technology (U.S. Department of Education, n.d.-d). Additionally, instructional strategies involving new technologies should be practiced and in place to meet today's digital natives (Gunter & Reeves, 2017).

Through numerous administrations and education reforms, it has been evident that student learning and achievement have always been the core of education. Each administration has reflected on areas where education can improve. As technology was introduced, it was seen that technology is a powerful tool that, when integrated into the classroom, can support and transform student learning, thereby improving student achievement (U.S. Department of Education, n.d.-f). To successfully integrate technology, teachers must have the knowledge to utilize the technology for best practices. Additionally, Tharumaraj et al. (2018) emphasized that teachers need to stay abreast of new forms of technology to stay relevant for their learners. To increase student performance and achievement, technology can enhance skills required to be college and career ready. These skills are called *21st-century learning skills*. In an article by Trust and Maloy (2017), 21st-century skills were defined as a

> broad set of knowledge, skills, work habits, and character traits that are believed—by educators, school reformers, college professors, employers, and others—to be critically important to success in today's world, particularly in collegiate programs and contemporary careers and workplaces. (p. 256)

Twenty-first century skills include collaboration, creativity, critical thinking, and problem solving. These skills being incorporated into the curriculum is not only useful for students in school, but also essential to prepare students for their future (Önür & Kozikoglu, 2020; Valtonen et al., 2017).

Valtonen et al. (2017) emphasized that students of this generation and the future are expected to possess these skills to be ready for college and careers. Advancements in technology have also changed how students learn in the classroom (Shafie et al., 2019). Students in the 21st-century are very dependent on technology because they have been exposed to it their whole lives. As the world has changed rapidly due to new developments in technology, these advancements have also changed how education works (Shafie et al., 2019). Today, traditional teaching and learning methods are deemed lower order thinking skills and are considered inappropriate for the digital native. However, teachers can foster higher order thinking skills such as critical and creative thinking through technology to improve student achievement (Hsiung, 2018). Today's students are considered digital natives. Because of digital natives' prolonged exposure to technology, teachers are now faced with a new challenge to incorporate technology into their lessons, almost making lectures obsolete in classrooms (Shafie et al., 2019). To emphasize, Tharumaraj et al. (2018) added that educators must adjust the way in which they deliver their lessons to meet the needs of different learners in the 21st-century.

Additionally, all responsibilities have fallen into the hands of educators to ensure that students are prepared to survive in this era. Given the change that schools are seeing because of globalization, it falls in the hands of leaders to ensure that there is reform in

the curricula so that technology is being implemented to teach students how to apply technology to solve problems, collaborate, and be innovative and creative thinkers (Tharumaraj et al., 2018). Moreover, it is well known that these skills are not separate from content but are always connected with subject matter, making it essential to integrate technology into every core subject (Häkkinen et al., 2017).

The world's economy has become a competitive arena in which employees need to be productive to improve the economy, which eventually leads to improving the well-being of others. For a nation to be competitive in a global economy, its human capital (workers) must be trained and educated to develop its natural resources and improve productivity and technology (O'Lawrence, 2017). Tharumaraj et al. (2018) explained that it is crucial to prepare students today and in the future with the skills, knowledge, and tools demanded with globalization and technological advancement. When students enter the real world, they need to be equipped with the knowledge and skills to be productive employees. Additionally, they are expected to possess the skills to collaborate, solve problems, be creative and innovative thinkers, and use information and communication technology to be effective (Valtonen et al., 2017).

To become productive employees, students need to hone such skills at an early age. This is where schools come into play. Schools must integrate these skills into the curriculum. One of the most effective ways of teaching 21st-century skills is through the use of technology. The use of technology allows students to find effective ways to solve problems. It can enable students to work collaboratively to find solutions. It can allow students to be more innovative and find newer ways to solve problems.

Teachers' Perception Toward Technology Integration

Technology is rapidly advancing, evolving, and spreading throughout the world (Islahi & Nasrin, 2019). It is permeating every aspect of society, including businesses and education. Technologies such as computers, tablets, and mobile devices have become innovative tools that aid educators and learners in K-12 settings and higher education. In research conducted by Khlaif (2018), teachers' attitude was influenced by the availability of technical support, which includes training, schools having access to the technology, perceived ease of use, and benefits of technology in education. These factors influence teachers' attitudes toward adopting and accepting technology. Furthermore, having prior technology experience is another factor that determines a teacher's attitude toward adopting and accepting the use of technology in the classroom to support the lesson (Khlaif, 2018).

According to Adegbenro et al. (2017), teachers with low self-efficacy have difficulty completing tasks beyond their capabilities because they see themselves as incompetent. Additionally, Adegbenro et al. explained that attitudes and self-efficacy determine whether teachers adopt and integrate technology for best practices. Moreover, Vongkulluksn et al. (2018) clarified a relation between teachers' beliefs and competency and the quality and quantity of technology integration in the classroom. When teachers feel competent about using technology and about its value in education, teachers' tendency to use technology within their instruction increases (Uslu & Usluel, 2019). Teachers' perceptions, attitudes, and motivation regarding information and communication technology determine the use of technology in the classroom (Zamir &

Thomas, 2019). Although Zamir and Thomas's (2019) research focused on university teachers, the goal is to integrate technology to deliver lessons effectively to help students develop competencies that will prepare them to face challenges in life.

Overall, some barriers may limit the use of technology in the classroom, such as support, infrastructure, time, and motivation. One primary concern for teachers who attempt to use technology has been lack of technical support on campus (Hill & Valdez-Garcia, 2020). Although funding is allocated to schools to be equipped with new technologies, teachers still face barriers that limit the use of technology in the classroom. To better understand teachers' experience, attitudes, and perceptions, continuous support must be in place whenever teachers encounter technical difficulties. Administrators and leaders need to consider that teachers are at different levels of skill regarding the use of technology. To mitigate barriers and improve attitudes, incentives, support, and ongoing and relevant professional development and teacher training must be in place (Hill & Valdez-Garcia, 2020).

Improving Student Performance Through Technology

According to Önalan and Kurt (2020), when technology is implemented in the classroom in tandem with appropriate instructional methods, learning processes can be improved and increased. Technology integration is more than just teaching students how to use the basics of technology. It allows students to take risks to learn and be resourceful and construct their knowledge through experiences. Additionally, technology can promote active learning, engagement and participation, and interaction and collaboration.

Sawang et al. (2017) stated that many educators use technology to support student learning. There are various forms of technology available that can be used to motivate students to participate fully in the learning process. In Sawang et al. study, they focused on KeyPad, which is a response system. In their research, the use of KeyPads was associated with levels of student engagement. Technology in the classroom should not just be an add-on to the lesson, and it should be carefully aligned to the course objectives (Moore et al., 2018). Vercellotti (2018) also addressed how common technology is in the classroom, making learning more interactive and engaging. Also, the inclusion of technology within the curriculum supports students through collaboration and building relationships (Alley, 2019). The use of technology in the classroom can promote student engagement and learning. As teachers, proper planning is crucial when integrating technology. It must be intentional, ensuring that it is relevant to the lesson and connects with the learning objectives.

It is evident how technology has become common in the classroom, and it is important to understand how technology affects interactions within the classroom. Interaction and collaboration are essential skills students must learn to develop as they venture out into the real world. According to Tissenbaum and Slotta (2019), to promote collaboration, inquiry, and interaction, teachers must consider the design of their learning spaces. Furthermore, how students interact and what tools are used are important factors determining how students interact. One tool that can promote collaboration and student interaction is the use of technology in the classroom. With various types of technology,

students can easily collaborate to solve problems and provide critical feedback to one another.

Because technology is rapidly rising, it is important to consider the advantages of technology in the classroom to enhance student learning (Lee et al., 2019). One way teachers can incorporate more technology in the classroom is through a strategy called the flipped classroom. This idea shifts away from a teacher-centered classroom to a student-centered classroom. The flipped classroom can help students develop their digital competencies (Kostaris et al., 2017). Additionally, the flipped classroom promotes and increases higher-order thinking skills, active learning, and teacher-student interaction (Gough et al., 2017). Furthermore, this instructional strategy can boost 21st-century skillsets such as problem solving and collaboration (Lo & Hew, 2017). Finally, the integration of technology and the use of a flipped classroom can increase student engagement (Bond, 2019).

Technology Training and Professional Development

The United States is one of the many countries seeing significant changes in education, most notably in K-12 schools. Some changes school settings are experiencing include a change in policies, the arrival of new technologies, globalization, and immigration issues (Aydin et al., 2017). These challenges require the development of guidelines for all stakeholders so that they are prepared to meet the challenges. Because of these challenges and obstacles, research shows that schools need to modify their curriculum and instruction and create an all-inclusive culture. In addition to creating a new culture, researchers in universities must work with leaders and school districts to

decide what is most fitting—in terms of curriculum and instruction—in the school setting. Researchers also suggested that schools must invest in technology-use training so that teachers can effectively assess students and prepare students to be digitally literate (Aydin et al., 2017).

Teachers need to be trained to use new technologies, and they need to be prepared to effectively integrate them into the curriculum to meet the diverse and changing needs of students (Gunter & Reeves, 2017). There is a need for new professional development to model effective ways to help teachers become comfortable using technology (Mishra et al., 2019). As a result of all these changes school districts are facing, it is imperative that leaders are preparing teachers by offering continuous support in the form of professional development or teacher training which will enable them to stay abreast with the new forms of technology. According to Saydam (2019), there has been an increase in interest in professional development over the last two decades. Teachers are seeking opportunities for professional development to increase the professionalization of teaching (Saydam, 2019). More importantly, these pieces of training will help teachers effectively plan their lessons and improve their pedagogies (Aydin et al., 2017). Powell and Bodur (2019) also stressed the importance of professional development in promoting student learning outcomes.

One of the most recent changes in the curriculum was implementing the Common Core State Standards introduced in 2010. This new set of standards was created when students graduate from high school; they are equipped with the knowledge and skills to be college and career-ready (Common Core State Standards Initiative, n.d.). When most

states adopted these standards, schools implemented professional development to train and support teachers in implementing the new standards in their lessons (Woodward & Hutchison, 2018). Additionally, the Common Core State Standards (CCSS) also focused on technology use across all content (Woodward & Hutchison, 2018). Woodward and Hutchison (2018) explained that, in general, studies had shown the effectiveness of professional development; however, not many studies have been done regarding professional development focusing on technology integration. Because there are some discrepancies and inconsistencies in technology integration, many teachers still have a hard time integrating technology into their lessons, therefore, needing more support (Woodward & Hutchison, 2018). Georgiou and Ioannou (2019) explained that despite the impact of technology on learning, the integration of technology in the classroom is moving at a slower pace.

Within a given school year, teachers participate in professional development mandated by their administrators; however, most of the training does not offer the support teachers need to incorporate technology. Instead, teachers can seek support and create a mentorship program from their peers (Martinovic et al., 2019). Elliott (2017) stated that teachers and administrators often do not agree on which professional development topics are essential. Jones and Dexter (2018) also mentioned that school administrators disregard the importance of innovations and teacher learning opportunities. Because of this, teachers spend time working alone instead of getting the support they need to implement educational technologies in their classrooms (Martinovic et al., 2019). In Ismajli et al. (2020) study, it revealed that although teachers may have

access to devices does not mean the technology is being integrated in the classroom. Teachers need to be encouraged, followed by support through pieces of training for technology to be integrated effectively.

Aside from changes in educational reform, most notably in curriculum and instruction, schools are investing so much of their funds to purchase state-of-the-art technology for student learning. Funds are also needed to accompany training and learning opportunities for teachers to align their pedagogies and technology integration (Jones & Dexter, 2018). With new technology emerging, specifically communications technology, teachers can easily access resources and network with professionals that they can seek support from (Jones & Dexter, 2018). Teachers now have the luxury of engaging in learning activities from professionals who can support them in creating meaningful lessons using technology (Jones & Dexter, 2018).

Professional development or teacher training are strategies school districts use to increase and improve student performance. In research conducted by Ihmeideh and Al-Maadadi (2018), their results show that training programs impact teachers' perceptions and practices regarding integrating technology in their lessons. Additionally, Liu and Liao (2019) mentioned that professional development are essential in helping build teacher confidence and self-efficacy. Georgiou and Ioannou's (2019) study on teachers' concerns about adopting technology found that professional development programs positively affected and helped reduce in-service teachers' concerns regarding technology integration. Based on several pieces of literature, it is imperative that funds are also spent

on providing teachers with the support and training they need to mitigate teacher concerns and increase teacher self-efficacy.

Barriers

Technology integration in the classroom has impacted the ways students learn and the way teachers deliver their lessons. Although it has impacted education significantly, it has also created barriers in the 21st-century setting (Prasojo et al., 2019). Part of this barrier is the lack of uniformity among teachers regarding incorporating technology into their lessons. Francom (2020) explained that barriers continue to get in the way of integration, making it difficult for teachers to use the tools effectively.

According to Ertmer (1999), there are two types of barriers, first-order or external barriers and second-order barriers or internal barriers. External barriers include access, time, support, and training provided for teachers. Internal barriers are related to teacher confidence, self-efficacy, belief, and attitude towards using technology in the classroom (Dinc, 2019). Izmirli and Kirmaci (2017) suggested that teachers' ability to integrate technology should be seen as a different type of barrier separated from first-order and second-order barriers.

Francom (2020) investigated technology integration barriers and found that that time was the main barrier, followed by technical support and access, administrative support, and the least was teacher belief. Additional barriers included class size, school population, and years of teaching experience (Francom, 2020). Based on their findings, administrators need to find creative ways to mitigate such barriers that offer teachers more time to explore the technology and learn the best way to use the technology in a

lesson (Francom, 2020). Along with providing more time for teachers, administrators also need to ensure that proper training and professional development are in place to support teachers. For teachers to effectively integrate technology, the training must be up-to-date with the latest technologies relevant to student learning.

According to Vongkulluksn et al. (2018), having access does not mean higher integration of technology. Factors have to be taken into consideration, such as teacher beliefs. Although in Francom's (2020) findings, teacher belief was viewed as the least significant barrier of technology integration, this does not dismiss the importance of teacher beliefs and experiences integrating technology in the classroom (Vongkulluksn et al., 2018). Additionally, the lack of knowledge and skills relating to teacher use of technology and having access to technology are considered primary barriers (Izmirli & Kirmaci, 2017). Dewi et al. (2019) stated that teachers' knowledge and skills relating to technology is another obstacle that prevents the integration of technology in the classrooms in many countries. Dewi et al. (2019) explained that although teachers may have the technology readily available if they do not possess the skills or knowledge, teachers either underuse or overuse the technology in their lessons. Furthermore, the lack of skills and expertise has led to the rarity of integrating technology in the learning process (Dewi et al., 2019).

Teachers' belief in the use of technology has been seen to have a direct correlation to technology integration. In other words, teachers who believe that technology can help them improve their methods and style spent more time practicing and using technology in their classrooms (Vongkulluksn et al., 2018). Although

integrating technology can be time-consuming, a study conducted by Lindqvist (2019) showed that teachers still prioritize using technology in the classroom, albeit it being time-consuming. The reason being is they believe it to be effective in terms of supporting student learning (Lindqvist, 2019). Trainin et al. (2018) also discussed that when teachers see how technology connects to their instruction, they will gain interest and confidence towards integrating technology. Moreover, Trainin et al.'s discussion on relevancy resonated with prior studies regarding the direct relationship between teacher belief and technology integration. Understanding teacher belief and attitude is a good predictor of how well teachers use technology in their classroom, including the amount of time technology is used to promote more student-centered activities and higher-order thinking skills (Vongkulluksn et al., 2018).

Part of teacher beliefs, attitude, confidence, and self-efficacy is understanding teacher perception regarding how technology connects with instruction. Trainin et al. (2018) discovered that when teachers can combine technology with their instructions or lessons, this factor determines whether teachers will integrate technology. Equally important to increasing interest, schools need to raise awareness of the potential technology has in the classroom and to motivate teachers to see how technology can be connected to their instruction (Trainin et al., 2018). Once they see the relevance, they become interested in learning how to integrate technology to help support their instructions. As Francom (2020) discovered in his study, time is the main barrier to technology integration. Teachers are more interested in relevancy than learning how the tools work because that is time-consuming (Trainin et al., 2018).

Schools around the nation need to find solutions to mitigate barriers so that teachers can utilize the tools properly and effectively. Through various research, it is expected that barriers still exist regardless of technology access. The amount of money being spent on upgrading technology around the nation should also include proper and relevant training for teachers. When providing teachers with professional development or technology training, it is essential to show teachers how to use it to drive their instructions instead of spending so much time on how the tool works. When teachers see that it can be applied to their content, it changes their attitude and beliefs, motivating them of the possibility such tool can do to enhance their teaching style and activities.

Benefits

Although teachers face obstacles and barriers when integrating technology, the benefits outweigh the barriers. As mentioned, the responsibility is now placed on schools to teach students how to use technology to be ready for college and careers. Furthermore, technology has become a part of students' everyday lives, so schools must respond to the needs of the students (Murati & Ceka, 2017). Studies have shown the benefits of technology when integrated effectively, appropriately, and intentionally (Ihmeideh & Al-Maadadi, 2018). When integrating technology, it is important to integrate it with intention and ensure that it connects with the learning activities. For these reasons, technology can enhance student learning, motivation, productivity and offer teacher support in finding alternative instructions to support a diverse classroom (Izmirli & Kirmaci, 2017). Murati and Ceka (2017) also emphasized that using technology such as computers support teaching and helps build relationships between teachers and students.

Goh and Sigala (2020) explained that there are advantages to integrating technology in the classroom.

Some advantages include immersing students in real-world experiences, allows students to develop and strengthen their cognition, provide individualized feedback, attract student interest, and simplifying the content materials (Goh & Sigala, 2020). Furthermore, teachers who implement technology can develop, enrich, and cater to the needs of a diverse population of students. Technology integration and other information and communication technology allowed teachers to differentiate instructions and promote creativity in the classroom (Zipke, 2018). Using these tools enabled students to develop effective communication skills and motivated them to stay abreast and informed while encouraging them to learn new things (Murati & Ceka, 2017). In the same way, Fatimah and Santiana (2017) justified that technology is the latest form of instructional media that provides students with authentic and meaningful experiences while fostering positive behavior and creating an effective learning environment.

In addition to enhancing student learning and increasing student achievement, with the aid of technology, students can learn any topic they are interested in, learn through various resources, assess their understanding, improve their knowledge, and provide peer feedback (Zipke, 2018). Educational reforms are changing the way the system works. Students who went to public schools were all taught in the same manner. They were instructed to memorize facts and absorb information through lectures, the traditional way. By continuing this method of teaching, schools will continue to fail students. Because of new federal policies and changes in education, schools are straying

away from traditional teaching methods to a more inclusive and student-centered approach. By differentiating instruction, teaching digital literacy, and incorporating higher-order thinking skills, schools build a generation of self-sufficient and productive members of society (Zipke, 2018).

Technology also plays an integral part in assessing student understanding and student learning. The use of technology and various applications effectively captures the students' attention and engages them further into the lesson (Onodipe & Ayadi, 2020). Onodipe and Ayadi (2020) focused on mobile devices as a classroom response system. All the students participated in the learning activities, including the shy students and English Language Learners (ELLs). Using this strategy made it easier for teachers to identify students who understand the concepts and those behind them. Mobile devices were a great form of technology to assess student learning. For example, teachers followed up with students who got the answers wrong or asked students to justify their answers, enabling them to think critically (Onodipe & Ayadi, 2020). With the use of technology, teachers creatively found practical applications. With these applications, teachers created formative assessments, reviews, questionnaires, exit tickets, checklists, and even provided ways for both teachers and students to communicate immediately and effectively.

Technology has become an integral part of society. Everyone, in almost all settings, is hooked up to a device or form of technology. In education, it has become a requirement to use technology to deliver lessons as billions of dollars are being spent on technology, and districts are spending a large amount of money to prepare teachers to use

it in their classrooms (Masullo, 2017). Incorporating technology effectively and with intention has the potential to transform the way students learn (Makki et al., 2018). Technology is proven to teach students skills needed to be employable by businesses and pursue higher education (Önür & Kozikoglu, 2020). When teachers use technology to drive their instructions, it is not only fulfilling federal mandates but sustaining the global economy by producing citizens that are well-equipped, innovative, and creative thinkers and problem-solvers.

Implications

The ETTP offers system-wide training to all staff employed under the Western Pacific Region School District. This program provides extensive training to all staff relating to software and programs that can be potentially used in the classroom to engage students and enhance lessons through technology. The purpose of this basic qualitative study was to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. The findings of this study may result in social change by making lessons relevant to students and increasing motivation. Additionally, by making the lessons relevant through technology, students are more likely to succeed academically. More importantly, students are taught skills needed to survive in the real world, thus producing productive citizens.

Summary

This basic qualitative study explored how the teachers perceived the technology professional development program provided by the district and the experiences of

teachers related to instructional technology after taking the district training. Furthermore, the study focused on high school teachers, as high school students are the critical transitional group into college and the workforce. The literature provided pieces of evidence on the importance of technology and its role in the classroom. Technology is rapidly changing, and schools are expected to integrate technology in the classroom. A basic qualitative study was best suited for this study because qualitative research allows researchers to capture the thoughts and feelings of the participants, which is a critical part of constructing meaning and understanding based on their experiences. A variety of themes emerge through a qualitative study as the research is carried out and later analyzed. Section 2 of this document describes the methodology used for this study. It also includes data collection and analysis of the data.

Section 2: The Methodology

This section of the project study encompasses detailed information about the qualitative methodology used for this study. Section 2 focuses on the participant samples, access procedures (access to participants and coding procedures), methods for data collection, data analysis methods, and limitations.

A school district in the Western Pacific Region offers technical support for all administrators, teachers, and staff and highly encourages them to complete the ETTP. The program offers five courses that total up to 45 hours of coursework. Although this program is being provided to teachers, the district administrators implemented the ETTP to improve technology integration in the classroom as measured by the ELEOT, but there was no follow up to determine how the teachers perceived the technology training professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. Because of this problem, it was essential to explore how teachers perceived the technology professional development program provided by the district and teachers' experiences relating to instructional technology after taking the district training. The research questions that guided this basic qualitative study were the following:

RQ1: How do teachers perceive the technology professional development program provided by the district?

RQ2: What are the experiences of teachers related to instructional technology after taking the district training?

Although the program is offered to all teachers from Grades K-12, this study focused only on high school teachers because it fit the nature of the study. The selection of high school teachers was pragmatic because they are responsible for providing students with real and unique learning experiences to acquire 21st-century skills to prepare them for the real world. High school teachers are responsible for their students, who form the critical transitional group into college and the workforce. Thus, high school teachers are responsible for ensuring that they produce students equipped with the skills necessary for the future. As the global economy becomes a competitive place for future generations, teachers need to prepare students for college- and career-ready competencies. Therefore, students need to be ready with skills that will make them employable.

In this sense, finding solutions that will help teachers see the importance of integrating technology will benefit students and society at large. By integrating technology into the classroom, students will practice and master the competencies required to succeed in the real world. Using technology and other forms of interaction, teachers help students develop skills to become more independent and critical (Sloan, 2017). Furthermore, through daily interactions, teachers help students see their strengths and weaknesses (Sloan, 2017). In this manner, high school teachers prepare students for graduation and life after high school. According to Neitzel and Bertolini (2019), both academic confidence and high school environment relate to how well students will do in college, and teachers are intrinsic to developing both of these aspects. However, Fletcher et al. (2018) emphasized that academic preparation is not the only factor contributing to a

successful transition into the workforce. Teaching employability skills such as critical thinking, personal responsibility, and technological skills is also essential to preparing students for the workforce and college (Fletcher et al., 2018).

During my research study, I planned to find solutions to increase technology integration in the classroom as measured by the ELEOT. The study also emphasized the importance of every teacher and staff member in the district completing the courses offered by the program. Further, it underscored the importance of setting in place a tool so that the Educational Technology Training Program for teachers can collect accurate data to determine whether the program is achieving its goal, and to ensure that educators have access to high-quality tools that are well integrated to drive instruction and enhance learning.

Conceptual Framework

The conceptual framework used for this study was the TAM developed by Davis (1989). The model connects two constructs: perceived usefulness and perceived ease of use. The two constructs emphasize how high school teachers either adopt or reject the idea of incorporating technology. Many variables can be determining factors that can influence the use of technology. If high school teachers perceive technology as applicable and as making their job more efficient, their attitude toward using technology will change (Davis, 1989). When attitude toward the use of technology changes, behavior also changes. Another critical factor influencing technology is whether high school teachers view the technology or application as beneficial or valuable. If they find that the

technology can be helpful to their work, then they are most likely to adopt the use of technology.

In contrast, if high school teachers find the technology complicated or see that more effort is needed to learn how to use the technology, they are likely to reject the technology or application. According to Davis (1989), these constructs influence the user's attitude—in this case, high school teachers' attitude and behavior—when considering adopting or using technology. These theories were important to guide the study and understand teachers' perceptions and experiences using technology. This study may also help to clarify whether the educational technology program offers the support for teachers to perceive technology as useful and easy to integrate into the classroom to enhance learning and teaching. The findings are significant because the findings determine whether or not users—in this case, teachers—will use what they have learned and apply it in their classrooms.

Research Design and Approach

The purpose of this project study was to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. Due to technology advancements worldwide, schools are pressured to integrate technology into classrooms. Teachers most especially must prepare students for the changes of the 21st-century and need to help students develop competencies to meet current demands (Goradia, 2018).

The research design was a basic qualitative study. According to Ravitch and Carl (2016), the idea behind qualitative research is to understand individuals' experiences in their natural settings comprehensively. Korstjens and Moser (2017) also iterated that qualitative research provides a deeper understanding of real-world problems experienced by individuals or groups. Because the purpose was to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training, the methodology for this study involved interviewing 13 teachers from the high school level. According to Ravitch and Carl, the interview is the core of qualitative research, as it allows researchers to collect rich and contextualized data. When conducting interviews, a researcher aims to understand the participants' experience better and understand how the participants construct an understanding of a phenomenon (Ravitch & Carl, 2016**)**. More importantly, I explored the participants' encounters and perceptions and their alignment to the study and existing or similar topics (Ravitch & Carl, 2016).

Basic Qualitative Study Design

A basic qualitative design was used to understand the phenomena related to technology integration in the classroom. I chose this design because it is a flexible approach to understanding individuals—in this case, classroom teacher's experience and perception of the technology training program that they had completed (Ravitch & Carl, 2016). The data collection method in qualitative research design is iterative and not chronological, which is a crucial aspect to understand the problem presented. This means

that the collection method is recursive in the sense that participants who share their experience can also add information later on, and nothing is set in stone (Ravitch & Carl, 2016). Because qualitative research is iterative and inductive, it allows new information to unfold and emerge, eventually gathering more important data relating to the study (Ravitch & Carl, 2016). Using a basic qualitative study approach therefore allowed me to gather teachers' experiences regarding integrating technology in the classroom.

Further, a generic qualitative design, sometimes called a basic qualitive design, was used for this study because of its flexibility (Liu, 2016). According to Liu (2016), although a basic qualitative design is not guided by traditional qualitative methodologies, this does not mean that there is not logic behind it. Additionally, Liu explained that a basic qualitative design needs to be problem-oriented and should be able to answer its research question. I aligned the research question to the problem statement and purpose. In terms of the sampling procedure, a basic qualitative design requires purposive sampling. In my study, I selected the participants purposely (Liu, 2016). In a basic qualitative study, the researcher should collect rich data for analysis until reaching saturation. Data collection should end when no extra information surfaces (Liu, 2016), and through data coding, the researcher develops categories and themes. Using a basic qualitative design was justified for my study because of its exploratory nature. I collected, interpreted, and analyzed data by conversing with high school teachers to explore and understand their lived experiences as participants of the ETTP.

A quantitative research design was not appropriate for this study because variables were not considered, nor would they be used to find a relationship between

them. Additionally, no numerical data were collected. Rather, a basic qualitative design was used as the research design because it allowed me to establish a professional relationship with the participants to understand and decipher their perceptions and experiences of the ETTP. With this research, I did not intend to create a theory regarding technology integration or the teachers' experiences; therefore, the grounded theory was not appropriate for this study (Burkholder et al., 2016). Ethnography was not selected as a research design because the study did not focus on a particular cultural group. Burkholder et al. (2016) explained that long-term immersion in a cultural setting is required for ethnography; therefore, this design was not used for this study. A narrative design focuses on first-person accounts told in a story format having a beginning, middle, and end (Burkholder et al., 2016). Narrative research is similar to biography, history, and autobiography; it does not come from individual experiences (Burkholder et al., 2016). Because the research focused on experiences and perception, narrative research design was not used for this study. A case study was not used as a research design because I did not intend to describe a bounded unit's behavior (see Burkholder et al., 2016). Furthermore, the data collected were from interviews. In a case study, multiple sources are used to collect data, such as observations, meeting agendas, policies, and reports (Burkholder et al., 2016).

Participants

Ravitch and Carl (2016) stated that research must occur in a setting. The setting is an important factor to consider as it is directly related to the study and the research questions that guide it. The ETTP for teachers started its first cohort in 2012. There was a

total of 784 participants who enrolled and completed the program as of 2019. Of the total, 163 were high school teachers. The setting of this study was four high schools in the Western Pacific Region. The four high schools together serve 3,830 students. There are two other high schools under the district; however, they are located on different islands, so they were not included in this study due to geographic locations and funding. These sites were chosen because they were directly related to the participants of this study and the goal was to understand high school teachers' perceptions and experiences. Because this study was a basic qualitative study, the selection of participants did not require probability sampling but rather purposive sampling. Purposive sampling identifies participants who can provide relevant data for the research (Burkholder et al., 2016); therefore, a total of 13 teachers were sought as participants for this study. High school teachers were selected because high school students are of the critical transitional age for college and the workforce. High school teachers are responsible for ensuring that students are prepared with the skills needed for the real world. According to Sim et al. (2018), saturation can be achieved within 13 interviews.

Criteria for Selecting Participants

When selecting participants for a qualitative study, the sample size is not clearly defined because depth or saturation is more important than the number of participants chosen (Burkholder et al., 2016). Establishing criteria and strategy were two critical parts of the selection process (Burkholder et al., 2016). Additionally, for a qualitative study, the researcher needs to create a criterion to select which participants are eligible and ineligible for the study (Burkholder et al., 2016). It is crucial to consider the research

questions to identify participants who will help answer the research questions (Burkholder et al., 2016; Ravitch & Carl, 2016). Additionally, Ravitch and Carl (2016) emphasized that selecting the participants should be intentional because they can answer the research questions.

To meet participant criteria for this project study, each participant needed to be a highly qualified teacher at the high school level. For this study, the definition of highly qualified was a teacher with a bachelor's degree and state certification who had demonstrated competence in their core content by praxis test completion. Additionally, each participant needed to be employed by the public school system district. Further, each participant needed to have completed the ETTP between 2012 and 2020. For this study, I needed 12 participants. There have been numerous debates on the appropriate sample size for qualitative research (van Rijnsoever, 2017). I used the following procedures to obtain participants. I sent a letter to the Commissioner of Education (COE) to inform the district that my study would occur within the school district. During that time, I completed all the necessary forms needed to get approval from Walden's Institutional Review Board (IRB). After getting IRB approval, another letter was sent to the COE requesting the list of participants who completed the ETTP. The COE then informed the technology director to release the names of participants who completed the ETTP. The technology director released the information; however, the list only contained participants who completed the ETTP between 2017 and 2021 because the accreditation director managed the ETTP participant list for 2012 and 2016. I requested and retrieved the contact information for 2012-2016 ETTP participants from the accreditation director.

After obtaining the list of potential participants, I sent the first batch of recruitment letters to contacts not employed at my school. Because I only recruited six participants out of the 13 needed for my study, I sent a second batch of recruitment invitations to teachers who taught at my same school 1 week later.

Purposeful Sampling

Purposeful sampling was used to select participants for the qualitative research. Purposeful sampling means that individuals are intentionally selected to participate in a particular study because they have experience or knowledge of a phenomenon or reside within a specific location (Ravitch & Carl, 2016). The sampling process involved selecting the participants related to the study. I considered the research questions and whose experiences and points of view were relevant to this study to answer the research questions with integrity and collect relevant data (Ravitch & Carl, 2016). I interviewed teachers from one island who currently held a teaching position at the high school level. The interviews conducted helped me understand teachers' experiences and perceptions of technology training for teachers.

Obtaining Access to the Participants

Before selecting the participants for this study, I applied for and received IRB approval from Walden University. To start the selection process, I received consent from the commissioner of education (COE). All forms required to start the interview and data collection process were completed and submitted. It was also essential to work closely with the COE, technology director, and accreditation director to gather a participant pool. This helped in selecting only teachers who met the requirements as mentioned earlier.

The participants were those who completed the program anywhere between 2012 and 2020. The two directors sent me the contact information for teachers who participated in the ETTP. The technology director sent the names of teachers who participated from 2017-2021; the accreditation director sent names from 2012-2016.

I did not hold a supervisory role above the potential participants. I am a classroom teacher similar to the potential participants of this study. Because the Western Pacific Region School District is the only district, there was a possibility that the potential participants and I had met before the selection process. To counter negative consequences such as participants holding back information from the study or feeling uncomfortable sharing negative experiences about the program, the informed consent process ensured confidentiality for all participating teachers. I explained that no names or other identifying information would be used in publications or dissemination of the results. Pseudonyms were used to protect the participant and the location of where he or she is employed.

Creating a Research-Participant Working Relationship

I was able to identify potential participants from the list provided by the technology director and accreditation director because the school district where the study took place is small; however, I had no supervisory role over the participants. I sought to obtain 13 high school teachers to participate in the study. It was also important to ensure that the participants felt comfortable during the interview process to share their responses. As I began the interview, I thanked the participants for taking the time to participate in the interview process. Additionally, I reminded the participants that their

cameras should remain off because I only recorded the audio portion. I also ensured confidentiality by explaining that my committee and I were the only persons who had access to the recording and transcript. Finally, I reminded the participants that they could stop the interview at any time and reschedule if they needed.

During the interviews, I paid close attention to the participants' responses to establish rapport and assure them that their information was valuable to my study. I also showed respect for the participants by thanking them at the end of the interview. It was important for me to set aside personal biases and ensure that they did not affect my judgment since I was a participant in the ETTP in 2018. I developed a research-participant relationship by answering any questions they had about the study.

Data Collection

Data collection for qualitative research usually involves interviews, focus groups, observations, or documents (Carr et al., 2019; Moser & Korstjens, 2018). To select which data collection method was best suited for the study, I considered the purpose of the research and the research questions that guided it (Carr et al., 2019). Because the research design of this project is a basic qualitative study, and the research questions were based on teacher perceptions, the best method to collect data was to interview teachers to understand their experience firsthand. Moser and Korstjens (2018) underscored that interviews aim to articulate meanings based on the participants' experiences. Interviews involve the interviewer asking the participants questions and can be done face-to-face, over the phone, or online via emails (Moser & Korstjens, 2018). The main goal for

interviewing is to contextualize and create meaning of what the participants say (Moser & Korstjens, 2018).

Data Collection Methods

Qualitative research aims to collect non-numerical data such as opinions, feelings, and experiences (Clark & Vealé, 2018). Because the interview was used as a data collection method, the interviews took place online via Zoom due to social distancing requirements during the COVID-19 pandemic. Before conducting the interviews, I sent out letters of invitation to potential participants with the link to the informed consent form. Once 13 participants consented, I communicated with each participant via email to set up an agreeable time and date to conduct the interview. After the participants selected a preferred time and date, another email was sent to their personal email address that contained the time, date, and link for the Zoom session.

During the interview, I instructed the participant at the beginning of the Zoom session to turn off their camera because only the audio portion was recorded. The interviews took between 30 to 60 minutes. The interview was guided by an interview protocol that was reviewed by the committee members and a content expert to ensure the trustworthiness of the data. According to Rubin and Rubin (2011), having a protocol is a valuable tool during the interview process. A protocol serves as a formal conversational guide (Rubin & Rubin, 2011). Burkholder et al. (2016) also explained that the interview protocol tool ensures consistency during the interview process. Additionally, it is essential to have critical and interpretive thinking skills during the interview process because I was the primary instrument during the data collection process (Clark & Vealé,

2018). During the interview, I used a transcribing application called Otter.ai (n.d.). After the interview, I went back and listened to the recording to ensure that everything that was transcribed was true and accurate. I informed the participants that they would receive a summary of the transcript within a week and sent the transcript. Once I reviewed the transcription, I sent an email thanking each participant and requesting their feedback within a week for member checking. If the participants did not respond within a week, I assumed there were no discrepancies.

Creating the Interview Protocol

To create my interview questions, I followed three steps. First, I aligned the interview questions with the research questions, conceptional framework, and two doctoral studies. Second, I constructed the interview questions using open-ended questions to create an inquiry-based conversation. Third, an expert reviewed the interview questions (Appendix B). The development of the interview questions aligned with the research questions. By aligning the interview questions to the research questions, the questions became helpful during the research process. The interview questions should be intentional and relevant to the study because the goal is to unearth the participants' experience (Castillo-Montoya, 2016). Therefore, this study's interview questions considered the two research questions about teachers' perception of the technology professional development provided by the district and teachers' experiences related to instructional technology after taking the district training.

The TAM has been widely used in studies targeting users' acceptance of technology (Majid & Shamsudin, 2019). The interview questions focused on teachers'

experience, confidence, beliefs, perceptions, and attitude towards technology, all relating to the conceptual framework. The conceptual framework considered two constructs, perceived usefulness and perceived ease of use. If teachers find the digital tools introduced to be useful and easy to implement in the classroom, this situation would affect the attitude and behavior, making it likely for teachers to integrate the tools in their lessons. Furthermore, the interview questions were developed around the research questions to understand teachers' perceptions about the program and how it influences technology implementation in their instruction, and how they use technology in the classroom.

I located two doctoral studies from the ProQuest database to help me develop an interview protocol to collect high-quality data. Turner's (2020) doctoral study focused on high school teachers' experiences and perspectives regarding technology integration. Additionally, Starks-Ray's (2015) study was on perceptions of high school teachers integrating technology after they participated in professional development. These studies were very similar to this study's purpose; therefore, I was able to tailor my interview questions by using their interview protocol as a guide.

The second step was to construct an inquiry-based conversation. Step two involved developing questions that were different from the research questions, following social norms of conversations, a list of various questions, and a script with prompts (Castillo-Montoya, 2016). The interview questions contained multiple inquiries about the participants' experience using technology in the classroom before and after the professional development. The third step was to receive expert feedback. Feedback

provided me with information about how the questions were worded or phrased and if the participants would understand the questions. A former educational technology instructor at a local college provided feedback about my interview questions via email. The instructor's feedback focused on grammar and clarification. I reworded a few questions and added other questions that helped me gather more data regarding the ETTP. Furthermore, obtaining feedback provided an opportunity to ensure that the questions were clear, simple, and answerable (Castillo-Montoya, 2016).

Data Tracking and Record Keeping

Stahl and King (2020) emphasized the importance of ensuring a study's findings are congruent with reality. To ensure that the data collected was congruent with reality, one strategy I employed was member checking to ensure credibility and trustworthiness in the qualitative research. After the interview session, the audio recording of the interview was transcribed within a week. As the primary researcher, I transcribed each interview personally. This was important because it allowed me to become acquainted with the participants and gather meaningful information (Burkholder et al., 2016). To keep track of the data collected and record the interviews, I used Google Sheets to organize the data. I then summarized the main points of the interview in a single page and emailed them to the participant's personal email. This process is also known as member checking. I gave the participants a week to review the summarized transcript to make any clarifying remarks for member checking.

Gathering Data and Methods for Gaining Access to Participants

A letter was sent to the COE informing him of the study. I gained district approval, and another letter was sent to the COE requesting a list of high school teachers who completed the ETTP between 2012-2020. The list was requested through the technology director and accreditation director. After obtaining the list of potential participants, an invitation letter was sent individually to all high school teachers. The invitation letter was sent via email and included the purpose of the study, the approximate time of the interview process, and the voluntary nature of participation.

Additionally, the letter included a link to the informed consent form. The purpose of the informed consent was to ensure that the participants understood the purpose and nature of the study, especially if there were any risks involved. Before beginning the interview process, participants acknowledged by clicking "I consent" on the informed consent form. Additionally, I adhered to all the research policies at the Western Pacific School District.

Role of the Researcher

The role of the primary researcher was to collect data and make meaning of the participants' experiences and perceptions of the current local problem. Additionally, the researcher is a classroom teacher in the Western Pacific School District. The capacity that the researcher holds does not impact the data because the researcher does not hold any supervisory role in the school district. Because I collected data on participants' lived experiences, I was the main instrument for collecting and analyzing the data (Clark & Vealé, 2018). Additionally, it was essential for me to use interpretative and critical

thinking when collecting and analyzing data. Such skills are useful for me to be immersed in the participants' experiences as they were personal (Clark & Vealé, 2018). Making interpretations of the data was challenging because everyone's beliefs and thoughts are shaped by philosophical principles, which influence their ideas and how they construct meaning from their experiences. It is important to uncover opinions and beliefs, so a clearer picture of the phenomenon is presented (Clark & Vealé, 2018). Lastly, it was also essential to build trust and transparency with the participants. In doing so, all the participants were provided information about the study.

Data Analysis

Data analysis involves meticulosity, avoiding missing the smallest piece of data (Kalman, 2019). Furthermore, Burkholder et al. (2016) explained that data analysis is a process that examines and includes information to make sense of it. By carefully examining the data, I aimed to construct themes and eventually turn them into findings (Burkholder et al., 2016). For this study, interviews were used as the primary source of data collection. Luizzo (2019) described the interview as a conversation between the researcher and the participants in a question-and-answer format. During the interview process, it was important for the researcher to identify truths and untruths to collect accurate data (Luizzo, 2019). During the interview process, the participants' responses were recorded. This technique helped me transcribe and analyze the interviews to ensure that the data collected was rich in meaningful information that answered the research questions.

Data collected from the interview process were analyzed to help develop emerging themes. To make the transcription process smooth and efficient, I used Otter.ai's (n.d.) speech-to-text feature. To do this, I recorded the audio portion of the Zoom interview session. Additionally, I used the voice typing feature in Otter.ai to ensure that the transcription was verbatim.

Coding Procedure

According to Saldana (2015), codes are often used in qualitative research when analyzing the transcription of an interview. Data are usually organized using codes, generally using a word or short phrase. Codes are assigned so that the data that are similar to each other are put together (Saldana, 2015). To simplify this process, I analyzed the data and looked for patterns such as repetitive words or phrases. To distinguish codes from one another, a color-coding system was used to differentiate between words or phrases to organize the data. Any terms or phrases that were unusual or did not fit within the codes were set aside for further exploration.

Evidence of Quality

I acknowledged my biases to ensure quality findings because I was also a participant in the ETTP for teachers. To fully understand the participants' experience and perception, I had to set aside personal opinions, biases, and prejudices regarding the educational technology program. To do this, I strictly followed the interview protocol revised by the committee members to ensure that the data collected came from the participants. Additionally, the data were transcribed verbatim and coded based on commonalities and were categorized into themes during the analysis process.

Strategies to Establish Accuracy and Credibility of Findings

There are five criteria for trustworthiness for qualitative research: credibility, transferability, dependability, confirmability, and reflexivity (Korstjens & Moser, 2018). One of the criteria, credibility, focuses on the aspect of truth (Korstjens & Moser, 2018). To ensure accuracy and credibility, Korstjens and Moser (2018) suggest prolonged engagement, continuous observations, triangulation, and member checks. For this study, the interview process continued until the data reached saturation. I also used member-checking by providing the participants with a summarized transcript to look for discrepancies and ensure accuracy because the participants and I view data differently. (Burkholder et al., 2016; Korstjens & Moser, 2018).

Credibility. To ensure that qualitative research is trustworthy, it must meet a criterion, and these criteria ensure that the findings can be trusted (Korstjens & Moser, 2018). Burkholder et al. (2016) explained that credibility is similar to internal validity used in a quantitative approach. This meant that the data aligns with the research questions. Additionally, credibility assures that the findings are believable based on the data collected (Burkholder et al., 2016). To provide credibility for this study, I conducted member checking by providing each participant with a summarized transcript from the interview process. By completing a member check, I ensured that the findings are plausible and that the information synthesized by the interview process was a correct interpretation of the participants' views (Korstjens & Moser, 2018).

Transferability. Transferability is similar to external validity in quantitative research (Burkholder et al., 2016). Transferability simply determines if the findings can

be used in other situations. To do this, I provided a detailed description of the setting and data collection methods so that others can decide whether the study applies to other studies or settings (Burkholder et al., 2016). Korstjens and Moser (2018) further explained that the results could be applied to other contexts or settings by using different participants. This study met this criterion because it can be easily applied to other studies relating to teacher perception and experiences. It does not have to be about technology integration fully, but other issues teachers face in their school districts.

Dependability. Dependability is comparable to reliability in quantitative research (Burkholder et al., 2016). In quantitative research, reliability focuses on the instruments used to collect data and how consistent the results are (Burkholder et al., 2016). In a qualitative study, the idea of dependability is that evidence is shown regarding the consistency in data collection, analysis, and reporting (Burkholder et al., 2016). This meant that any modifications or alterations made in the procedures, which can happen in qualitative research, must be recorded, explained, and accessible (Burkholder et al., 2016). Korstjens and Moser (2018) defined dependability as precision or the stability of the findings. This study met this criterion by ensuring every procedure was clear, concise, and transparent to the participants. An interview protocol was created and reviewed by the committee members before collecting data. All information was recorded and transcribed verbatim. Each participant was given a summarized transcript to check to make sure all the information provided was accurate.

Confirmability. Confirmability relates to objectivity in a quantitative study (Burkholder et al., 2016). However, in qualitative research, where researchers collect data

through lived experiences or perceptions, subjectivity is present. The data collected should not be based on my viewpoints but should be from the data (Korstjens & Moser, 2018). To ensure confirmability, an audit trail was implemented. All the steps taken from the start of the study to the development of the findings were discussed with the committee members (Korstjens & Moser, 2018). Following the steps allows for transparency.

Limitations

According to Burkholder et al. (2016), research limitations consider weaknesses within the design or methodology. All research has flaws in both the design and methodology; therefore, it is essential to point out those weaknesses and describe the procedures to overcome them (Burkholder et al., 2016). One limitation that may influence the study was the participants' experience during the training program. When accepted to participate in the educational program, participants were broken into various clusters based on location. Each group had different instructors, but the content remained the same. Having different instructors will mean different experiences and perceptions regarding the program.

Data Analysis Results

Upon IRB approval from Walden University (05-05-21-0971349), I interviewed 13 participants for this project study. This sample size was sufficient to gather a rich data description of the participants' experiences during their time in ETTP. After gaining consent from each participant, I scheduled a one-to-one interview online via Zoom to satisfy Walden University's COVID-19 guidelines on social distancing. During the

interview, I reminded the participants that I would be recording only the audio portion of the interview.

Additionally, I explained to each participant that they could stop the interview and reschedule the interview at any time. A pseudonym was assigned to each participant. I used the letter "T" and a number to represent each participant. For example, the first teacher I interviewed was assigned the pseudonym T1. I was the only person who knew the identity of each participant.

The transcripts were organized to answer the research question. The research question was formulated to understand high school teachers' perception of the professional development program provided by the district and their experiences related to instructional technology after taking the district training. I used an application called Otter.ai (n.d.) to transcribe the interview. After the interview, I listened to the audio recording and read the transcript to make corrections to ensure that the participants' responses were accurate. After cleaning up the transcripts, I began to code them. I decided to use a cloud-based application called Quirkos (n.d.) to help me with the coding process. I uploaded each transcript onto Quirkos and coded the responses line by line. Quirkos allowed me to create codes. As I found similar words or phrases in the transcript, I coded similar passages with a similar code. Quirkos has a feature called "quirk properties". The quirk properties allowed me to add descriptions and definitions for each code I made. I listened and read each transcript multiple times to ensure I captured the participants' experiences accurately. The following are themes and findings from the interview transcripts. Next, I discuss the following topics by theme. First, I discuss the

evidence of quality of how the study followed procedures to address accuracy of the data. Second, I discuss discrepant cases I found during the data analysis. Then, I summarize theme outcomes logically and systematically in relation to the problem and research questions, the literature review, including the TAM framework.

Procedure to Ensure Accuracy and Credibility of Findings

First, I created an interview protocol to help answer the research questions. I made sure to align the interview questions with the problem statement, purpose, conceptual framework, and research questions. The interview questions were created to find solutions to the problem. After the interview process, I summarized the transcript in one page and sent it back to the participants via email. The participants were given one week to review the summary of the transcript. If I did not receive an email, then I assumed that there were no changes needed. This strategy is called member-checking. The purpose of reviewing the summary was to ensure that the information collected was accurate and true.

After the member checking process, I began analyzing the data. I coded the data line-by-line to find what themes emerged. I then created a matrix that included the research questions, interview questions, definition of codes, codes, additional information, categories, and themes. I created this matrix to organize the data and to cross check and ensure that not themes were left out (see Appendix C). It was important for me to create this matrix to organize the data and to ensure that all information was aligned. Once I completed the matrix, I went back to each interview question and each transcript to make sure that no information was left out. I also made sure that no information was

repeated. Then, I double-checked and realized that no more information emerged, and no new themes emerged, this meant I reached saturation.

Discrepant Cases

After analyzing my data to develop themes, I refined and made revisions to some themes. I had to go back and reread the transcript and the matrix that I created to organize the data to determine if the themes reflected the data (Ravitch & Carl, 2016). In order to ensure the credibility of the findings, I had to search for negative cases or discrepant cases (Ravitch & Carl, 2016).

During data analysis, I found that two participants contributed a little to developing themes for this study. The codes that I created from their transcript were set aside to be reviewed at a later time. After the four themes emerged, I revisited the codes and noticed that they did not belong, nor did themes emerge from their data. It was important not to force data to fit my ideas (Ravitch & Carl, 2016). Furthermore, it was also essential to be transparent when discrepant cases emerged during data analysis. Although the discrepant cases did not fit with the themes, they provided codes that were valuable information that added to the credibility of my study (Creswell, 2014).

Findings

After analyzing the data, four themes emerged. Table 1 lists the four themes and describes each theme.

Table 1

Summary of Themes

#	Theme	Description
1	Content-specific technology training	The need for technology training on content-specific or domain-specific tools for high school teachers.
2	Ongoing technology training/professional development	The need for periodic and continuous technology training for teachers to continue integrating technology with up-to-date technology tools.
3	Technology professional development increases teacher confidence	The ETTP increased user confidence in integrating technology in the classroom.
4	Teachers learn new tools	Teachers learn about new tools when technology specialists demonstrate new tools that they might consider using in their classroom.

The first theme was Content-Specific Technology Training. This theme is related to the need for technology training on content-specific or domain-specific tools for high school teachers to integrate technology better to enhance lessons. Teachers are equipped with desktops, Technology on Wheels (TOWs), printers, iPads, Elmo document cameras, and TVs, to name a few types of technology tools in their classrooms. Participants discussed different technology tools such as Google Apps, YouTube, web-based tools, note-taking tools, graphic design platforms, BlackBoard Ultra, and game-based learning. These tools are examples of domain-specific technology tools desired by teachers to enhance their content and engage students.

The second theme, Ongoing Technology Training/Professional Development, referred to the need for periodic and continuous technology training for teachers to

continue integrating technology with up-to-date technology tools. Teachers recommended that ongoing technology training or professional development should occur annually. Ongoing Technology Training/Professional Development is an excellent way for teachers to participate and add new tools into their toolbox of technology tools. The ETTP first launched in 2012 and recently ended with the ninth cohort in 2021. Teachers who completed the training program early on are not exposed to newer technology tools. Although the ETTP has been revamped to reflect the latest technology tools, early participants seek updates for the newer technology reviewed in the program.

The third theme, Technology Professional Development Increases Teacher Confidence, focused on how the ETTP increased user confidence in integrating technology in the classroom. The ETTP was put in place to help teachers to integrate technology tools to enhance their lessons. The program's framework included five courses that expose teachers to different strategies and tools to implement in the classroom.

The fourth theme was Teachers Learn New Tools. This theme referred to teachers learning about new tools when technology specialists demonstrate new tools they might consider using in their classroom. The technology tools introduced during the program allowed teachers to fill their toolbox with additional educational technology tools. These tools can be used to engage students, enhance the content, and promote student technology literacy.

Theme 1: Content-Specific Technology Training

The first major theme that emerged during data analysis was labeled Content-Specific Technology Training. This theme covered a variety of codes relating to content-specific technology training. The codes related to this theme include technology integration, time, not content-specific, irrelevant, general, elementary level, common apps, and content-specific. All these patterns led to the development of this theme. During the interview, many of the participants revealed the need for content-specific technology training. Although all participants used devices provided by the school to utilize technology in the classroom, teachers also utilized various technology tools to assess and engage students and enhance the content. Technology tools are used through various content areas and are considered a crucial tool to help students succeed. All participants used desktops, TOWs, printers, a projector, ELMO document camera, TV, and iPads to deliver their lessons in the classroom. Regarding technology tools, all participants integrated the following: Google applications, web-based learning tools, graphic design platforms, BlackBoard Ultra, Achieve 3000, and game-based learning tools into their lessons to assess and engage students.

The participants believed that technology is an integral part of the classroom and has been for many years. When the participants were asked, "Do you think you still need support in regards to technology integration? Do you feel the need for additional support in regards to technology integration specific to your course content?" many of them expressed that they needed content-specific professional development. T5 stated, "Absolutely. I wish we had more PDs about it…I actually addressed that to them [school

administrators] that we should have more PDs related to our content." T7 felt that more technology should be integrated into social studies. At the same time, T8 expressed that they wanted more applications and content in the science content area because English and math received more domain-specific technology training support. T8 elaborated that science teachers were unaware of domain-specific applications. T9 wanted to learn more about strategies for integrating technology in essay writing and reading stories. T10 remarked that they looked forward to learning about tech tools in their content area. T11 supported the expression of the previously mentioned teacher and stated, "I would really appreciate if the ed tech program for science is purely for science like use technology that we can actually use for the lab." T12 shared not having enough skills relating to programs such as Achieve 3000 and Renaissance and would like training on the new features because there have been some changes.

Based on the interviews, content-specific technology training is something high school teachers look forward to moving their content forward. The results from Theme 1 agreed with Fernandes et al. (2020). Fernandes et al. stated that content-specific technology training helped teachers familiarize themselves with new methods for their content. Additionally, teachers use different technology tools to meet the needs of a diverse student population (Fernandes et al., 2020). Likewise, professional development informed teachers about knowledge and skills relating to technology tools (Hammond et al., 2019). Professional development allowed them to make decisions relating to inquiry-based lessons to meet the diverse learners in the classroom (Hammond et al., 2019)

The participants shared that they attended various professional development or training relating to technology; however, many teachers felt that professional development was not specific to their content. Like Kalonde (2017a), many participants relied on their own experience to find tools or applications relating to their content. The participants believed that technology is an integral part of learning and teaching. However, a few reported having access to content-specific training to properly equip them to use specialized technology tools or applications relating to their content. Kalonde had similar findings where for teachers to use content-specific tools adequately, teachers must receive training.

Theme 2: Ongoing Technology Training/Professional Development

The second theme that emerged after the data analysis was labeled ongoing technology training/professional development. This theme covers a variety of codes relating to ongoing technology training/ professional development. The codes related to this theme were support, involve the teachers, listen, needs, survey, more training on science tools, inform teacher, and continue to provide professional development /training. All these patterns led to the development of this theme. Teachers expressed the need for follow-up or continuous technology training or professional development to integrate technology with up-to-date digital tools. The participants shared that the district leaders can continue supporting teachers by offering continuous technology training to update them with the latest tools and best practices.

Furthermore, the participants shared that even after completing the ETTP and various technology professional development, they still need additional support. T2

expressed that district leaders need to support teachers by listening to what teachers say about technology professional development. In the classroom, the one size fits all model does not work. To meet the needs of the different learners, T2 stressed, "I think administration and key management needs to keep listening and seeing what are the needs of the teachers…If that be in the form of a piece of technology or a subscription or training, whatever it is that's necessary." T3, on the other hand, shared that district leaders need to provide more opportunities for teachers to be exposed to different conferences relating to technology. T3 went on to say, "I think we need to expose teachers to more of these conferences, so that we can learn the up-and-coming technologies and programs and apps and that stuff."

T5 shared that the school district needs "to provide more professional development to teachers, and probably hire someone who's actually proficient in explaining a specific application or a tech tool so we would benefit from it." T6 shared that the other teachers who are knowledgeable in technology can support other teachers by sharing tools they use successfully in the classroom. For T7, there is a need for more professional development relating to U.S. history and technology integration for social studies and teachers in general. T7 went on and added that there are free and simple technology tools out there that are effective; however, no training or professional development is being offered to teachers. T9 shared her experience about the shift in teaching from face-to-face to virtual. The teachers received a month-long training for BlackBoard Ultra, the learning management system adopted by the school district. Even with the training provided, T9 reported that teachers still had a hard time learning the ins

and outs of the learning management system. T11 shared the importance of lab-based technology in the classroom. T11 also emphasized the need to train teachers to properly use and integrate tools for science, especially in a lab setting.

Additionally, T11 has many devices and sensors but does not know how to use them. Hence, the participants believed that continuous and ongoing training or professional development for content-specific technology use is essential for teachers to integrate and enhance the content effectively. Finally, T12 shared that district leaders need to keep teachers updated, especially when changes within the ELA programs.

Continuing professional development or ongoing professional development supports teachers by ensuring that they enhance their skills and competencies in their domain (CPD, 2016). Foschi (2020) explained that continuous professional development has become a crucial part of educational policies as it improves the quality of education in schools around the world. Teachers have perceived continuous professional development as a need to stay abreast of their content (Foschi, 2020). Professional development serve as a foundation for improving teachers' beliefs, competencies, and technology practices (Zinger et al., 2017). Moreover, prior studies have shown that for technology professional development to be effective, extended or continuous professional development is needed. Additionally, access to technology, opportunities for teachers to actively engage, and time to address individual needs and collaboration with peers are needed to be effective (Zinger et al., 2017).

Theme 3: Technology Professional Development Increases Teacher Confidence

The third central theme that emerged after the data collection was that technology professional development increases teacher confidence. During the interview, teachers were asked to share their confidence in integrating technology before completing the ETTP. The codes that helped developed this theme included: confidence (before), not so confident, fairly confident, challenge, and little assistance. A follow-up question was later asked about their confidence after completing the ETTP. The codes related to this theme were confidence (after), increased, learned new technology tools, eye-opening experience, confidence increased, and more confident. All these patterns led to the development of this theme.

Before completing the ETTP, the participants' confidence levels varied concerning integrating technology in the classroom. When asked, "How confident were you in integrating technology before completing the program?" some teachers shared that they were not confident. In contrast, others shared that they were confident. I asked a follow-up question, "How confident were you in integrating technology after completing the program?" Some participants' confidence levels remained the same after completing the ETTP.

Before the ETTP, T2 shared that she was pretty confident using technology in the classroom. She also considered herself a risk-taker. She is willing to try new things to improve her teaching and student learning. After completing the ETTP, T2 shared that her confidence increased because she is now part of the ETTP team. T3 shared that before completing the ETTP, it was her first year teaching. She was not confident

integrating technology, but after the ETTP, her confidence grew. She managed to take what she learned and apply it to her teaching. T5 and T6 were competent in using and integrating technology in their classroom before the ETTP. For T5, the courses were more of a refresher but managed to learn new technology tools. T6, on the other hand, mentioned that her confidence grew a bit more after completing the ETTP because she was already teaching online before completing the ETTP. T7, T8, T9, and T10 shared that they were fairly confident using technology before the ETTP. After the ETTP, they all felt that their confidence level increased to some degree. T12 and T13 both shared that they were not confident with technology entering the ETTP. However, after completing the ETTP, they both felt comfortable using technology in the classroom.

Technology professional development/training has an impact on teachers' confidence in integrating technology in the classroom. Professional development can assist teachers in promoting 21st-century learning in the classroom through a technological, pedagogical, and content framework (Koh et al., 2017). The ETTP provides a rigorous framework that focuses on technology and other instructional strategies that can improve teachers' pedagogies and knowledge in the classroom. Koh et al. (2017) explained that professional development increases teachers' confidence levels in creating lessons integrating technology that reflect 21st-century skills and increasing teachers' confidence utilizing information and communications technology. Like Flavell et al. (2019), my participants shared that technology training can positively influence teacher attitudes and experiences integrating technology in the classroom. Additionally, after completing the ETTP, my participants' confidence and perceived ease of use

increased. Flavell et al. discussed that technology training can increase teachers' confidence and usability of digital tools in the classroom.

Flavell et al. (2019) and Koh et al. (2017) studies justified the importance of teachers' technology training and professional development. Both studies claimed that technology professional development could increase teachers' confidence, usability, and the frequency of integrating digital tools in the classroom to promote 21st-century skills. As technology evolves, it is crucial to keep teachers informed about best practices for integrating technology. Furthermore, up-to-date tools could increase student outcomes and prepare them for real-life (Koh et al., 2017). Continuous technology training and professional development will allow teachers to remain informed to serve their students better (Flavell et al., 2019).

Theme 4: Teachers Learn New Tools

The fourth major theme that emerged after the data collection was technology teachers learn new tools. During the interview, teachers were asked to describe their experiences when they completed the ETTP. The codes that helped developed this theme included: learned new technology tools, advanced computer applications, relevant, useful, technology integration, useful and pragmatic, practice, and excited to learn and integrate. Additionally, teachers were asked if the courses offered were relevant to their line of work as a teacher and if the courses offered were relevant to their content area. The codes created were relevant, instructional strategies, Google apps, student engagement, and digital citizenship. Finally, teachers were asked about the benefits of completing the ETTP and was completing the ETTP beneficial to them as a teacher. The

codes related to this question include provided tools, exposure, comfortable, tech tools, enhanced content, stay abreast, awareness, teaches how to navigate and utilize technology and tools, and efficiency.

After completing the ETTP, teachers learn about new tools when technology specialists demonstrate new tools they might consider using in their classroom. The ETTP developed a framework to allow participants to participate in rigorous coursework. The ETTP offers five courses that allow the participants to gain new technological skills to enhance their practices in the classroom. Courses such as Google Apps for Education offer teachers the skills to foster 21st-century learning skills in the classroom. Teachers will also learn to work with the various Google apps, including Gmail, Docs, Sheets, Slides, Sites, and Blogger. Student Tech Products is another course offered by the ETTP designed to provide teachers with digital tools to engage students in the classroom. Classroom Instruction That Works (CITW) focuses on best instructional practices using technology. It allows teachers to explore various tools that they can implement in the classroom.

The ETTP has made teachers aware of how effective technology can be in the classroom. Additionally, the ETTP introduced different technology tools that can be integrated into the classroom. T2 shared that the ETTP has helped with "opening my eyes to the fact that there's stuff out there." T3 expressed that the ETTP did not only teach about applications and technology tools but introduced various strategies to implement in the classroom. T5 shared, "I just learned a bunch of stuff from that training that I

incorporated in the classroom." Additionally, T5 mentioned that "It was more of a refresher on my part and also learning new things."

T6 found the ETTP to be relevant to their job as a classroom teacher. T6 said, "when I took the EdTech Cohort, it just opened up a lot of resources that I can use that I found…relevant to my course, that could make learning fun and engaging." T9 also supported the previous teacher and expressed that the ETTP supplied her with more tools to integrate further within her content. T7 shared that he took away valuable things from the ETTP that he could incorporate into his classroom, eventually becoming a part of his teaching. T8 shared that it was an "eye-opening experience." T8 learned different strategies and shortcuts from the ETTP.

Additionally, she shared that she did learn an assortment of digital tools, Prezi being one of them. T8 and T9 both encourage other teachers who have not completed the ETTP to sign up because it is an excellent opportunity to learn new things that can be helpful in the classroom. For T9, although some of the things that were taught were more of a refresher, she still learned new technology tools. T9 modeled the strategies her instructors used in the program and saw that they had profoundly impacted her teaching. T10 was already comfortable using mainstream technology tools. However, the ETTP provided him with additional technology resources and tools that he had never used before. T11 shared that she was more aware of the different tools out there. T11 grew to love using Adobe because of the ETTP and continues to use it today. T12 continued to integrate different strategies that she learned from the Digital Citizenship course. T12 continued using game-based learning to assess her students as well as other graphic

design platforms that are free. Her experience with technology has changed after completing the ETTP. The integration of technology made her job as a teacher more efficient. T12 expressed that her students enjoyed it when technology was integrated into the lesson. Finally, T13 shared, "I'm still thankful that I learned some tools from the EdTech Program, and I use them in my classroom. So that's the positive side of it."

Conclusion

The problem of this basic qualitative study was that the district administrators implemented the ETTP to improve technology integration in the classroom as measured by the ELEOT, but there was no follow-up to determine how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. Therefore, this basic qualitative study aimed to explore how the teachers perceive the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. The research questions explored how teachers perceive the ETTP and the experiences of teachers after taking the training. This study was guided by the TAM (Davis, 1989).

I interviewed 13 high school teachers from the Western Pacific Region School District after receiving IRB approval to answer the research questions. I organized the transcripts to answer the research questions. I coded each transcript line-by-line. As I created codes, I also defined each code to make the analysis process efficient. After coding and defining codes, I created categories for each interview question. After

categorizing the codes, four themes emerged from the analysis. The first theme was that technology tools and devices are well embedded in the classroom. However, there is a need for technology training on content-specific or domain-specific tools for high school teachers to integrate technology better to enhance lessons. The second theme was a need for follow-up or continuous training or professional development for teachers to continue integrating technology with up-to-date technology tools. The third theme was that technology training increases user confidence in implementing technology in the classroom. The fourth theme was that technology training makes teachers aware of other technology tools to integrate into the classroom.

The first research question focused on teachers' perception of the technology professional development program provided by the district. The findings of this study revealed that teachers had a positive experience during their time in the ETTP. The participants shared that they learned new tools to integrate into their classroom to enhance the lesson and move the content forward. The participants appreciated the tools introduced during the training and the instructors' strategies to deliver the lessons. The teachers shared that many of them instantly modeled the strategies that the instructors used in their classrooms.

The second research question centered on teachers' experiences related to instructional technology after taking the district training. Similar to the first research question, the teachers learned new digital tools to implement in their classrooms. Furthermore, the teachers shared that their confidence in integrating technology in the classroom increased after completing the ETTP. However, the teachers still felt some

components were missing, especially technology tools relating to their content. There is a need for content-specific professional development or training. The teachers also emphasized the need for follow-up or continuous training to integrate technology. They felt that although they learned new tools from the ETTP, technology is advancing, and there are tools that they are not aware of. Therefore, it is imperative to receive continuous support through content-specific technology training and ongoing or continuous professional development. Based on these findings, I recommended a 3-day professional development/training focused on content-specific technology tools, Project-Based Learning (PBL), and lesson planning. The project will be discussed in Section 3 of this study.

Section 3: The Project

In this basic qualitative study, I collected data to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. The data revealed that the participants continued to utilize technology and technology tools within their classrooms to enhance the content and engage their students. They also felt more confident integrating technology after completing the ETTP. Furthermore, they collectively felt that technology is an essential tool to use in the classroom. After completing the ETTP, they felt that their beliefs were affirmed as they saw how powerful technology tools could be when used correctly and responsibly. Using technology, teachers perceived that they could foster skills that would make students college ready and employable. Technology has become an integral part of education. According to Sakulprasertsri (2017), 21st-century learners need to be armed with skills and knowledge that they will need in their future careers. One way that students can obtain these skills and knowledge is through engagement. Wekerle et al. (2020) emphasized that technology in education encourages students to be not only active learners, but constructive and interactive learners as well. These skills, also known as 21st-century learning skills, are essential to be employable today and in the future.

Four major themes emerged from the data: content-specific technology training, ongoing technology training/professional development, technology professional development increases teacher confidence, and teachers learn new tools. Based on the results and the outcomes, I decided to create a professional development training that

focuses on content-specific science technology tools and applications. The intended audience for this professional development is high school science teachers. The professional development aims to address themes related to content-specific technology training, ongoing technology training, and teachers learning new skills.

Description and Goals

I prepared a 3-day professional development for the project that actively engages district high school science teachers through discussions, lesson planning, and application. The professional development includes various activities to keep teachers engaged and focused. Some of the activities in this professional development are unpacking the Next Generation Science Standards (NGSS), focusing on the priority standards for each content area, and creating a detailed lesson plan integrating specific technology tools or applications relating to science. The following are the goals of the project:

- increase teacher knowledge about the importance of technology integration in science,
- provide teachers with experiences to collaborate to create science lesson plans utilizing various technology tools,
- provide teachers the opportunity to investigate and demonstrate technology tools to support instructional strategies to engage students, and
- provide teachers the opportunity to explore, identify, and integrate technology to enhance learning activities to meet learning objectives and science standards within their respective disciplines.

After completing the 3-day professional development, the participants will incorporate science-specific tools in their classroom to enhance their lessons. Additionally, teachers will be able to implement an inquiry-based approach using technology to help students develop problem-solving and critical thinking skills in the classroom.

Project Outline

The 3-day professional development includes 3 full days or 8 hours of collaboration, discussion, application, and planning. On the first day, teachers will break out into their specific content areas (i.e., environmental science, biology, and chemistry) to review the priority standards. The priority standards are a selected subset of content-specific standards from each content area that high school students must know after completing their science courses (Ainsworth, 2003). The priority standards were selected from the list of NGSS.

After understanding the priority standards, the teachers will be introduced to science-specific digital tools and applications. The two digital tools are PhET and Nearpod (Nearpod, n.d.; PhET, n.d.). The reason that these tools were selected is that PhET (n.d.) provides an array of simulations in physics, biology, and chemistry. Furthermore, the simulations highlight the relationship between real-life phenomena and information that encourages an interactive and constructivist approach, provides feedback, and fosters creativity among students (Akinwale & Kehinde, 2017). Overall, science learning utilizing PhET simulation can improve critical thinking among students (Hasyim et al., 2020). As for Nearpod, it has a feature that can embed PhET simulations

as an activity within a presentation. Nearpod allows for interaction, student engagement, and active learning (Sarginson & McPherson, 2021). Nearpod also includes other activities such as quizzing, polling, games, interactive videos, and collaboration (Sarginson & McPherson, 2021). The features supported by PhET and Nearpod would be especially helpful for high school science teachers because they would allow students to interact, engage, and use their critical thinking skills.

The second day will focus on project-based learning (PBL). The PBL approach will prepare teachers to develop lessons that integrate a hands-on approach after completing this professional development. The purpose of the PBL approach is to stimulate and increase student engagement in science classrooms (Mahasneh & Alwan, 2018). On the final day, teachers will work alongside their peers to create a lesson using one of the priority standards and integrate digital tools and the PBL approach. The teachers will be using the understanding by design (UbD) format for lesson planning. UbD is divided into three stages: (a) determining what students want and what knowledge they must acquire; (b) establishing acceptable learning evidence—in other words, determining how to determine that students have achieved the desired results; and (c) developing learning opportunities and instructions—for example, determining which activities should be performed in order to accomplish all desired goals (Gloria et al., 2019). Teachers will use this design to develop formative assessments. Formative assessment throughout the stages of UbD can help students improve their understanding (Gloria et al., 2019).

The learning outcomes are statements that define what teachers should know or be able to do by the end of the professional development. Because the project involves a 3-day professional development, the learning outcomes are broken down daily. The following are the learning outcomes for this 3-day workshop.

Day 1 Learning Outcomes

- Create a student-centered classroom by promoting student agency and empowering students to take charge of their learning through the use of PhET simulation.
- Explore ways to incorporate Nearpod in the science classroom to assess student understanding and support student interaction and engagement.

Day 2 Learning Outcomes

- Plan and design project-based activities using the backward design framework.
- Incorporate digital tools into project-based lessons to promote collaboration and engagement in the science classroom.

Day 3 Learning Outcomes

- Design and create authentic lessons that incorporate the PBL approach to promote critical thinking and problem-solving skills.
- Design a lesson that integrates technology to promote active learning in the science classroom.

Throughout the 3-day workshop, teachers will share ideas and work collaboratively to create lessons that they can later implement in their classroom.

Rationale

The findings of this study indicated the need for content-specific professional development relating to science. Although they have completed various technology training and professional development programs relating to technology and their content area, the participants felt that technology was not the focus of the training or professional development. T8, a high school biology teacher, shared that she would like to learn more applications that are specific to her content. T11, a high school chemistry teacher, also shared that she would appreciate it if the ETTP offered courses or tools specifically for science.

The participants all shared that they are equipped with various technology in their classroom; however, they lack content-specific tools and applications when it comes to technology tools. The first day of the professional development will allow teachers to participate in discussions about technology integration and its importance. Furthermore, teachers need to unpack the NGSS and focus on the priority standards to create lessons that integrate specific science technology tools and applications to enhance the content and engage students. The professional development will allow teachers to work in homogenous groups (e.g., all high school chemistry teachers) to collaborate and create a lesson plan on one of the priority standards. Through small group sessions, teachers will also provide feedback to each other to enhance the lesson plan. Furthermore, teachers will be introduced to PhET (n.d.) Interactive Simulations. Teachers will be allowed to explore the simulations and their features and decide how to integrate them into their lessons and ensure that they meet the priority standards.

Based on the themes that emerged from my study, there is a need for content-specific professional development for teachers at the high school level. The 3-day professional development will address the needs of science teachers and introduce them to simulations that can be embedded into their lessons. The professional development will take place during the summer before teachers report back for the next school year. The professional development will continue annually every summer for teachers to advance their knowledge, skills, and attitudes to continue meeting the demands of 21st-century learners (Nooruddin & Bhamani, 2019).

Review of the Literature

The findings from the data collection justified the literature review on the need for content-specific professional development, specifically for high school science teachers. Professional development was chosen as the genre for the project because it was evident that the participants felt that although the ETTP introduced them to various technology tools and instructional strategies, content-specific tools and applications were lacking. The teachers felt that they did not receive enough technology training relating to their content area. The request from teachers justified the need for a professional development focusing on science-specific technology training/professional development. The literature review includes the following:

- a discussion on the importance of content-specific technology training, specifically science technology training or professional development;
- the impact of continuous professional development to give an understanding of the selected genre;

- PBL with the use of technology to encourage active learning and critical thinking to engage students; and
- science simulations, specifically PhET Interactive Simulations as a technology tool to promote evaluative and critical thinking and inquiry.

I used the following databases—Education Research Complete, Education Source, ERIC, APA PsycInfo, Computers & Applied Science Complete, ERIC, Teacher Reference Center, Sage, and Research Starter—Education—to locate relevant, up-to-date, and peer-reviewed articles. I narrowed my search to locate articles between 2017 and 2021. I utilized the Boolean/phrases search modes to help me find relevant articles. Finally, I utilized Ulrich's verify peer review feature located in Walden's Library to ensure that the articles were peer reviewed. The terms I searched for were *science professional development*, *science technology training*, *chemistry professional development*, *project-based learning and technology*, *inquiry-based and technology*, *PhET simulations*, *continuous professional development*, and *science simulations*. When I searched for the terms above, the databases produced a sufficient amount of information for the literature review.

Science-Specific Technology Training/Professional Development

One of the major themes that emerged from the data collection and analysis was the need for content-specific professional development. According to Ferand et al. (2020), if teachers are ineffective in a particular subject area, students will receive less education on that subject matter. Therefore, for teachers to engage in the same forms of scientific inquiry that their students are expected to engage in, it is critical to provide

educators with the opportunity to do so (Ferand et al., 2020). Content-specific professional development is a solution to increase teachers' scientific inquiry and knowledge of their content (Ferand et al., 2020). Ferand et al.'s results showed that teachers improved in both personal science teaching efficacy belief (PSTEB) and science teaching outcome expectancy (STOE) concepts during their attendance at the STEM-It Up professional development, with slight decrease in post to post-posttest. The finding showed that content-specific professional development helped teachers in both PSTEB and STOE.

Clary et al. (2018) focused on 81 middle school science teachers who attended a professional development provided by the Teacher Academy for the Natural Sciences (TANS). The professional development catered toward chemistry, physics, and geosciences. Although the study was geared toward middle school teachers, this type of study is transferable to high school teachers attending professional development to gain knowledge. According to Clary et al., content-specific professional development affected teachers' content knowledge and teaching skills, significantly impacting student achievement. Additionally, many stakeholders such as universities, teacher preparation centers, and school districts secured funding to provide teachers the opportunity to increase their content knowledge in science through science-specific professional development (Clary et al., 2018).

Moreover, teachers can learn effective classroom strategies and improve their teaching efficacy through content-specific professional development (Clary et al., 2018). The findings from this study showed teacher knowledge scores in chemistry, geoscience,

and physics through the completion of the 10-day summer to the end of the professional development year (Clary et al., 2018). Teachers who attended the TANS showed significant gains in science topic understanding in all three disciplines, while statistically comparable control teachers showed no increases (Clary et al., 2018). The information gathered from Clary et al.'s (2018) study helped justify the design of the 3-day professional development that I created for high school science teachers. Similarly, the project design focuses on three disciplines (environmental science, biology, and chemistry). Professional development aims to raise teacher knowledge of the usefulness of technology in science, collaborate on scientific lesson preparation using multiple digital tools, and construct relevant science lessons.

Technology has become widespread throughout education, and science is also evolving in K-12 education. Therefore, leaders need to find ways to provide teachers with technology training on effective instructional strategies to integrate technology into science (Hu & Garimella, 2017). Hu and Garimella (2017) conducted a mixed-method exploratory study to evaluate teacher preparation and comfort with teaching science after a 100-hour professional development workshop. Teachers learned about how to conduct scientific curriculum with technologies in K-4 classrooms. Thirty certified elementary teachers attended the technology professional development (Hu & Garimella, 2017). The findings showed that the participants used technology well in science instruction. The teachers applied their knowledge and skills in the building of a 5E (engage, explore, explain, elaborate, evaluate) lesson plan to involve students actively in science learning activities and evaluations. In general, participants enjoyed the professional development.

The participants found the programs useful in their classrooms. Participants' responses to questions about their experience largely matched their initial expectations and the top three priorities mentioned in the Excellence in Elementary School Science (EESS) Pre-Workshop Survey. Results showed that teachers reached their own professional growth goals, which were to create a more student-centered environment and promote active learning through the use of technology (Hu & Garimella, 2017). The design of the Hu and Garimella workshop supported my project design in which teachers had time to collaborate and plan lessons that involve technology and PBL.

In the same way, society's technology usage is fast rising, and classroom teachers must acknowledge the effect and value of technology in their students' lives (Menon et al., 2020). Additionally, scholars and funding agencies have recognized the critical role of technology in teaching science in K-12 schools. This acknowledgment has increased teachers' chances to receive technology professional development (TPD) to facilitate the meaningful incorporation of technology into disciplinary contexts (Lee et al., 2017). Lee et al. (2017) investigated the impact of a two-year technology professional development (TPD) for teachers on student achievement in science in the western United States. TPD for middle-school science teachers focused on information and communications technology (ICT) and their applications in science inquiry pedagogy. Thirty-six teachers volunteered to participate in the professional development. The data collected from teachers were from three surveys: Survey A focused on technological skills, Survey B focused on ICT capabilities, and Survey C focused on pedagogical beliefs about science inquiry (Lee et al., 2017).

The findings of this study found considerable advances in using technologies and ICTs in both years of TPD participation, indicating teachers' continuing growth in technical abilities during two years of TPD (Lee et al., 2017). Lee et al.'s study design supported my project's design as described in this section. At the end of each day, teachers will evaluate the effectiveness of the professional development. Teachers will share what aspects are valuable to them as a classroom teacher. Furthermore, the project includes observations from the administrators, which provides valuable feedback to teachers with respect to technology integration and PBL in the classroom.

Because of the widespread use of technology, science and technology are now critical to the economy and our daily life (Hu & Garimella, 2017). Today's students must develop a strong understanding of scientific principles and methods to become well-educated citizens and prepare for most occupations in the 21st-century (Hu & Garimella, 2017). For teachers to be equipped with the best practices and strategies to prepare students to be well versed in science and technology, professional development must be readily available to support teachers. Also, content-specific professional development can help teachers target PBL and technology integration that support the alignment of standards, curriculum, assessments, and pedagogies (Hu & Garimella, 2017). In a study conducted by Kalonde (2017a), the findings revealed that rural teachers needed professional development to become familiar with newer instructional technologies and obtain technological skills in instructional technology integration.

Kalonde's (2017a) findings and other studies discussed in this section impacted my decision to select a 3-day professional development for the project study along with

the request from the participants. Studies regarding content-specific professional development and its effect in increasing teachers' content knowledge and instructional strategies motivated me to select, plan, and design a 3-day professional development. During the three days, the instructor will introduce digital tools that teachers can integrate in their classrooms to keep students engaged, while empowering students to use their critical thinking and problem-solving skills.

Technology can enhance learner-centered learning, particularly in the science classroom, and result in students developing a more profound knowledge of scientific subjects (Rosenberg & An, 2019). For instance, interactive simulations can help students grasp abstract concepts by allowing them to create, conduct, and revise their experiments and test hypotheses quickly (Rosenberg & An, 2019). Additionally, technology can encourage collaborative research and discussion among students. Different technologies promoting learner-centered science instruction include model creation, interactive tutorials, personal response systems, and probeware (Rosenberg & An, 2019). However, teachers confront numerous challenges to digital integration, particularly when attempting to implement pedagogical improvements concurrently (Rosenberg & An, 2019). To address the challenges to learner-centered technology integration, Rosenberg and An's (2019) study established a contextual mentoring program for science teachers and investigated the mentoring program's effects on teachers' attitudes about technology integration, technology integration practices, and perceived barriers.

Continuous Professional Development

It is widely recognized that the teacher is the primary facilitator of all educational activities conducted inside or outside the educational setting (Saleem et al., 2021). A teacher is the focal point of all activities and curriculum. Teaching is a vital profession in any culture. The reason for this is because a teacher is not only a facilitator of educational, curricular, and co-curricular activities; they also assist in educating individuals who will one day make a significant change to improve the nation (Saleem et al., 2021). In order for teachers to continue providing professional services to students and to continue making a difference globally, they need to sharpen their tools and knowledge in their profession.

Additionally, teacher training is critical for their professional growth. Professional development enhances an individual's and an institution's efficacy and efficiency (Saleem et al., 2021). Saleem et al.'s (2021) study introduced participants to a new teacher training program called continuous professional development program framework. The participants were primary school teachers. The findings of this study showed that continuous professional development met respondents' academic needs by providing new information and abilities, as well as a formative evaluation strategy for their classroom (Saleem et al., 2021). Additionally, the continuous professional development program improved teacher collaboration. It increased teachers' overall classroom performance (Saleem et al., 2021). Continuous professional development is needed to enhance efficiency and efficacy. Srinivasacharlu's (2019) study listed the advantages of continuous professional development:

- Continuous professional development prepares teachers to stay current with the new advances, such as technology, continually.
- It reorients teachers by providing them with current information and advances in the area of education and technology.
- It prepares pre-service and in-service teachers for the 21st-century, a world where the only constant is change, by improving their digital skills and competencies.
- It enables educators to learn the newest instructional methods, models, and approaches.

  It allows educators to contribute to the development and modification of curriculum, textbooks, and assessment.

The participants of this study addressed the need for follow-up or continuous technology training to continue integrating up-to-date digital tools. The participants also shared that the district leaders can support teachers with continuous technical training to update them with the best technology tools and practices. Furthermore, it is noticeable that technology has advanced and continues to advance. Because of technology advancements, information and communication technology has created opportunities for strengthening the learning process at all levels in education (Lucas et al., 2017). Moreover, the teaching profession in the 21st-century is undergoing considerable change due to various reasons, including the introduction of digital technologies (Srinivasacharlu, 2019). Similarly, Nooruddin and Bhamani (2019) stated that today's teachers are facing a rapid transformation in their field due to technology. Teachers need

to stay abreast and constantly update their knowledge, abilities, and attitude (Nooruddin & Bhamani, 2019).

Classroom teachers will be making a significant mistake if they ignore these changes and their implications in teaching (Srinivasacharlu, 2019). Thus, to train effective future teachers in the 21st-century, teachers must constantly update and equip themselves with ever-increasing skills and competencies to stay at the top of their field and serve society (Srinivasacharlu, 2019). Staying updated is feasible, but only if they commit to continuing professional development. Additionally, providing teachers with continuous support and training, particularly in technology, can boost teachers' confidence, enhance their innovative skills, and push them to their jobs more efficiently in the classroom (Saleem et al., 2021).

Lucas et al. (2017) said that information and communication technology had enabled significant advancements in K-12 settings. Schools and classrooms, both physical and virtual, require teachers to teach the content and integrate technology concepts and skills (Lucas et al., 2017). Teachers need to be equipped with technological skills and resources (Lucas et al., 2017). Thus, continuous professional development opportunities should be provided to teachers and administrators who contribute to creating curriculum. It is not a one-time occurrence; it must be maintained via coaching and frequent updates (Lucas et al., 2017).

Martins-Loução et al. (2020) investigated the Lisbon Botanic Garden continuous professional development (CPD) course on inquiry-based science education (IBSE). The authors aimed to learn if the CPD helped teachers, as learners, build a reflective practice

of their learning process with a parallel development of questioning focus in their teaching practices. Martins-Loução et al. hypothesized that the CPD design offering theoretical foundation, as well as practical experiences both in the Botanic Garden and in their classrooms, allowed teachers to comprehend better IBSE pedagogy applied to biodiversity and climate change education (Martins-Loução et al., 2020). The sample size was 40 teachers. The findings indicated that the CPD program effectively overcame teacher misconceptions about IBSE (Martins-Loução et al., 2020). Teachers evaluated and reflected on their practices. Finally, they devised new instructional strategies for applying scientific inquiry in their lessons about biodiversity and climate change in their classrooms (Martins-Loução et al., 2020). Martins-Loução et al.'s study informed my decision to include PBL in the 3-day professional development. Although inquiry-based and project-based are two different approaches, the goal is to increase student engagement in the classroom and empower students to take charge of their learning to construct knowledge and find solutions to problems.

Integrating Technology in Project-Based Learning

PBL is defined as learning-centered projects involving students in investigations (Choi et al., 2019). More precisely, PBL enables students to learn by pursuing solutions through the process of asking questions, debating ideas, making plans, and interacting with others (Choi et al., 2019). Teachers' self-efficacy increases when they have a positive classroom experience (Choi et al., 2019). Thus, changes in classroom experience can affect teacher self-efficacy (Choi et al., 2019). Choi et al. (2019) expressed that PBL can significantly impact both teachers' and students' classroom experiences. PBL can

potentially change the way teachers teach, students learn, and teachers and students interact, thus affecting teachers' perceptions of their effectiveness as educators (Choi et al., 2019). The PBL approach in the classroom allows teachers to use higher-order thinking skills to prepare students for 21st-century jobs. Chen and Yang (2019) used meta-analysis to examine the effects of project-based learning versus traditional education on student achievement. Chen and Yang explained that PBL engages students in problem-solving by searching, analyzing, evaluating, and synthesizing knowledge. Chen and Yang studied articles from 1998 to 2017. Forty-six articles were assessed, representing 12,585 students from 189 schools in nine countries (Chen & Yang, 2019). Their findings showed that PBL has a moderate to substantial positive influence on student academic achievement (Chen & Yang, 2019).

Al-Abdullatif and Gameil (2021) conducted a study to construct a model to assess how digital technology integration improves students' academic performance through PBL. The TAM was used to investigate the impact of digital technologies on undergraduates' learning engagement and academic achievement within PBL. Although the study was on undergraduate students, future researchers can do a similar study at the high school setting to understand students' academic performance using PBL as an instructional strategy. The findings indicated that when digital technology is introduced into the PBL setting, TAM-related factors such as perceived ease of use, perceived usefulness, attitude towards integrating technology, and students' learning engagement positively affected academic performance (Al-Abdullatif & Gameil, 2021). Also, incorporating digital technologies into the design and implementation of PBL is

extensively practiced across all disciplines and is becoming increasingly popular (Isa & Kamin, 2019). Al-Abdullatif and Gameil stated that technology could increase challenge, diversity, and choice by providing several levels of activities to match student knowledge and ability, increasing access to diverse sources of information, and expanding project questions.

Moreover, technology can boost student enthusiasm and promote active learning throughout the project (Al-Abdullatif & Gameil, 2021). Gómez-Pablos et al. (2017) studied PBL with digital technologies and interviewed 310 teachers. The teachers were from different levels, including nursery, primary, secondary, post-16, and vocational training (Gómez-Pablos et al., 2017). They discovered that the projects increased student engagement (95%) and motivation to study (96%) as well as helped them develop curricular abilities (90%). As for students, Perrault and Albert (2018) claimed that PBL could improve students of various age groups' attitudes, leading to more positive and sustainable behaviors in the future. Perrault and Albert conducted their study in a mid-sized Midwestern University. The total participants included 28 students. Perrault and Albert's findings informed the design of my professional development with high school students. The students were assigned to develop a campaign plan for the university's Student Office of Sustainability. The goal was to find effective methods for the office to communicate its objective to the student body via a communication campaign (Perrault & Albert, 2018). Students at the high school level can create projects similar to a communication campaign. Students can be encouraged to develop a communication platform (e.g., videos, websites, blogs, and vlogs) to promote or campaign issues relating

to science. Perrault and Albert's study is relevant to the 3-day professional development project because teachers are encouraged to use the PBL approach in their classrooms. Furthermore, a project like this involves the use of digital tools to promote their campaign. Similarly, the high school teachers who attend the professional development can design a project similar to Perrault and Albert's to promote awareness among high school students while encouraging them to use various forms of digital tools to get their messages across.

Another study conducted by MacMath et al. (2017) focused on high school teachers' perception of PBL. The study used two teacher focus groups to collect data. The initial (before the first project-based unit) and final (after the semester) focus group interviews included four teachers (MacMath et al., 2017). The teachers who participated in the study varied in content and years of experience. The four teachers emphasized that students were highly engaged (MacMath et al., 2017).

When asked to describe PBL in their own words, the teachers emphasized the significance of soft skills such as communication and collaboration. The teachers also shared some challenges they faced during the implementation of PBL such as student grouping (MacMath et al., 2017). All four teachers thought that the projects increased students' maturity and responsibility for their learning; however, some students were dissatisfied by the shifting roles of student and teacher. High-achieving students considered PBL more challenging than other classroom activities because they were responsible for their learning rather than simply following directions. During the final interview, the teachers discussed how PBL might help students develop critical thinking,

presentation, and research skills and foster an environment that promotes student diversity (MacMath et al., 2017). Overall, the teachers perceived many benefits of PBL, such as the following:

- Focusing on soft skills like communication and collaboration increased students' abilities. Teachers noticed significant increases in students' presentation and research skills. Students also learned to value peer feedback when given.
- There was improvement in students' self-regulation, confidence, and capacity to work independently.
- There was an increase in students' critical thinking skills and capacity to transfer those skills across all content areas.
- There was an increase in student involvement and enjoyment when working with PBL (MacMath et al., 2017).

MacMath et al.'s study is significant to the project because one of the learning outcomes is that teachers will incorporate digital tools into PBL lessons to promote collaboration and engagement in the science classroom. As MacMath et al. discovered, PBL can increase students' critical thinking skills, confidence, collaboration, and engagement in the classroom.

PBL, in tandem with technology in the classroom, can be a powerful tool to unlock student interests and motivation. In addition, PBL fosters 21st-century learning skills such as critical thinking and creativity (Mohamadi, 2018). Mohamadi (2018) found that the utilization of technology and PBL in an English as a second language classroom

motivated higher education students to complete their learning tasks successfully (Mohamadi, 2018). Although technology and PBL are gaining interest in education, access to such an approach is a barrier to underserved districts (Escobar & Qazi, 2020). According to Escobar and Qazi (2020), children from wealthier districts have more significant opportunities to develop STEM abilities than students from underprivileged districts. To help counter this imbalance, Escobar and Qazi launched the Building Unique Inventions to Launch Discovery, Engagement, and Reasoning in STEM (BUILDERS) program in 2017 with funding from the National Science Foundation's ITEST program. This PBL program employed the makerspace concept to allow students to investigate how they can use science and technology to solve local problems (Escobar & Qazi, 2020). Students worked in teams during the BUILDERS Academy to design, build, and test technology-based solutions to community issues (Escobar & Qazi, 2020). They learned and applied STEM principles, learned about STEM jobs, and developed critical 21st-century skills. Escobar and Qazi's findings showed how extracurricular STEM interventions provided underserved kids with enhanced access to STEM education.

Studies have shown the effectiveness of technology and PBL. The following results showed that the two approaches are a powerhouse in the classroom. In a study conducted by Baser et al. (2017), PBL proved to improve students' advanced technological and collaborative abilities and expose them to technology-enhanced science methods. Another study by Winasih et al. (2019) showed that secondary level students taught through PBL utilizing electronic posters (e-poster) outperformed students taught through traditional methods. Although Winasih's study focused on English as a foreign

language, results demonstrated the effectiveness of technology and PBL. PBL activities helped EFL students use technology and improve their oral communications (Winasih et al., 2019).

Furthermore, Han (2017) found a correlation between PBL attitudes and STEM significant intentions. Han showed that secondary students who felt happy about participating in PBL activities believed more in STEM benefits and chose STEM disciplines in college. PBL coursework may inspire more students to major in STEM, a field that many choose not to pursue (Han, 2017). Finally, in a study done by Samsudin et al. (2020), the findings demonstrated that STEM PBL increased high school students' confidence in their ability to tackle physics problems. As proven by various studies, the potential participants of this 3-day professional development can implement various PBL activities with technology integration to cater to the different learners in the classroom. One of the participants mentioned that the one-size-fits-all approach does not work in today's classroom. Students who enter the classroom come from different walks of life. According to Wurdinger et al. (2020), a teacher’s role includes helping students reach their highest potential, empowering them to construct knowledge around them, and inspiring them to be creative in finding solutions to whatever problems they face. Moreover, teachers can prepare more meaningful and authentic lessons using PBL (MacMath et al., 2017). PBL can increase student engagement and have a significant effect on their academic achievement. Finally, teachers can pique students' interests through various projects and empower students to choose multiple careers in the STEM field (Han, 2017).

Implementing PhET Simulations in the Classroom

PBL is a great way to engage students and promote active learning in the classroom. Similarly, simulations can also foster active learning and promote 21st-century skills in classrooms as students explore natural phenomena through PhET simulations (Akinwale & Kehinde, 2017). When students use PhET simulations, they are presented with content through an interactive computer interface that allows them to "play" with the content to come to their conclusions about how it works (Bennett & Boesdorfer, 2020). In these simulations, numerous data representations are used, from the animation itself to supporting tables, graphs, and other visual representations of the information (Bennett & Boesdorfer, 2020). In a study done by Bennett and Boesdorfer (2020), students demonstrated considerable progress when using two simulations, Pogil and PhET, on their post-test about the structure of atoms, isotopes, and ions. The number of times students were observed explaining numerous representations to their partner or team and debating their stance grew with each activity. Pogil and PhET guided inquiry activities in this high school classroom effectively assisted students in learning and applying numerous science principles promoted by NGSS (Bennett & Boesdorfer, 2020). In another study done by Astutik and Prahani (2018), PhET was used in junior high school classrooms. Although the focus was on junior high school students, the same idea can be applied in high school classrooms. PhET (n.d.) offers lessons that cater to middle school and high school students, providing a wide range of curriculum resources. Astutik and Prahani's study found an increase in scientific cooperation among students. As a

result of this study, junior high school students' creativity in natural science learning improved (Astutik & Prahani, 2018).

Furthermore, Ndihokubwayo et al.'s (2020) study found improved optics learning in Rwandan secondary schools using PhET simulations and YouTube videos. In their study, 136 seniors taking physics from six different schools, were divided into three groups and taught using traditional methods, using traditional methods supported by PhET simulations, and traditional methods supported by YouTube videos (Ndihokubwayo et al., 2020). The results showed that students taught using PhET simulations and YouTube videos made substantially more progress than those not instructed with PhEt or videos (Ndihokubwayo et al., 2020).

Another study like Astutik and Prahani (2018) focused on junior high school students. Prima et al.'s (2018) study centered on students' understanding and enthusiasm to learn the solar system using PhET simulation. The findings showed that PhET simulation improved students' conceptual knowledge and motivation more than those taught without using the simulation (Prima et al., 2018). Likewise, Putranta et al. (2019) findings revealed that problem-based learning with the inclusion of PhET simulations used in physics learning activities increased students' critical thinking skills when learning about work and energy.

Price et al. (2019) sought guidance from 1,500 teachers who used PhET as an instructional strategy from a teacher's standpoint. Price et al. listed various strategies that were aligned with NGSS that can be used while using PhET simulations in the classroom.

A survey was used to collect teacher responses. The responses indicated that teachers utilize simulations to target numerous learning goals.

Moreover, teachers used simulations to assist students to "visualize science phenomena or representations" and "develop conceptual understanding" (Price et al., 2019, p. 48). Most teachers utilized PhET to help students "explore and discover ideas" and "develop enthusiasm or interest in science" (p. 48). Based on their survey, Price et al. (2019) used simulations proactively, positively effecting student learning and achievement. Because of the many positive indications regarding the use of PhET in the classroom from my participants, I recommend that my participants and other high school science teachers in my district attend the 3-day professional development to increase classroom outcomes. Price et al. confirmed that teachers use simulations to engage students in NGSS science practices to meet several learning goals. They anticipated that sharing the results will inspire other teachers to use simulations in their classes. Likewise, I hope that high school science teachers will take away valuable information that they can use in their classroom from the 3-day professional development. Finally, after completing the 3-day professional development, science teachers can enrich their classroom and teaching practice by sharing their sim-based lessons with other teachers.

Project Description

The professional development plan is designed to cover three full days of training. Each day will last for eight hours. High school science teachers, special education teachers, the science program coordinator, and administrators should be present. The 3-day professional development will take place during the summer. The 3-day professional

development will occur in the summer because it provides the intended audience with enough time to prepare for the upcoming academic year. The administrators will be responsible for having monthly meetings with the science teachers to check their progress.

Additionally, my participating teachers sought feedback; therefore, I recommend that administrators complete three classroom observations to provide feedback to science teachers about the integration of digital tools. Based on the results of this study, high school science teachers expressed the need for content-specific technology training. Therefore, it was appropriate for the science teachers to get feedback from the administrators regarding integration of digital tools. The administrators will set up a pre and post-conference. During the pre-conference, the teacher will provide the administrators with a lesson plan outlining the project. The administrators will observe the following:

- Teachers integrated PhET simulation to assess student understanding of science-specific concepts.
- Teachers incorporated digital tools into project-based lessons to promote collaboration and engagement in the science classroom.
- Teachers designed and created lessons that integrate PBL to promote critical thinking and problem-solving skills.

The administrators will also review the rubric (see Appendix D) used during the observation. The reason why I chose this rubric was that it focused on the key elements of PBL (Buck Institute for Education, n.d.). After the observation, the administrators and

teacher will meet again to go over the rubric. The administrator will share their constructive feedback and what areas went well, and what areas need improvement.

After the 3-day professional development, teachers will receive a certificate to acknowledge their attendance. The professional development will count towards the teachers' certification. The Western Pacific School District requires instructors to renew their certification. For example, Basic I certification needs 120 hours of approved school district seminars, workshops, or in-service training. Basic I has a two-year expiry. Teachers must demonstrate 120 hours of seminar, workshop, or in-service training approved by the school system to obtain a Basic II certification.

Basic II has a three-year expiry. Teachers seeking Standard certification must demonstrate 180 hours of seminar, workshop, or in-service training. Among other requirements, teachers renewing their Standard certification must present documentation of 300 hours of training. Valid for five years. Finally, to get a Professional certificate, teachers must demonstrate 300 hours of training. Those renewing their Professional certificates must show documentation of 600 hours. The Professional certificate is the highest level of certification available in the Western Pacific Region School District. It is important to note that there are other requirements to obtain a certification, not just professional development, seminar, or workshop hours.

The 3-day professional development was designed to address the needs of the participants of this study. Each day, the intended audience is allowed to collaborate and share ideas to be proactive in the classroom and empower students to use higher-order thinking skills and 21st-century skills to tackle real-world problems. In Day 1, science

teachers will have five hours of collaboration time to unpack the priority standards and explore the two digital tools that were introduced (PhET and Nearpod). In Day 2, science teachers will have 4.5 hours of collaboration time to brainstorm and outline their projects for PBL. Finally, on Day 3, science teachers will have 3.25 hours of collaboration time to lesson plan and discuss ideas relating to technology integration and PBL.

Day 1 of the professional development will be titled "Technology Refine: PhET and Nearpod." At the beginning of the first day of the professional development, teachers will break out into content-specific areas (i.e., environmental science, biology, and chemistry). Each content-specific area will review the required NGSS and select their priority standards. Working in smaller groups will allow teachers to share ideas as to how they meet the priority standards. Often, teachers plan alone and struggle to find the appropriate activities and resources, and as a result, their lessons are not meaningful. Once the content teachers have unpacked the priority standards, the professional development will then move into the technology part of the training. The technology portion will introduce PhET simulations and Nearpod and showcase how powerful these tools can be when implemented correctly and with intent in the classroom. The teachers will also be given time to explore and find simulations that align with the priority standards. Additionally, teachers will need their laptop and charger because all resources are accessible online.

Day 2 will build from Day 1. Day 2 will be titled "Pioneer Learning Through PBL." As the professional development title suggests, teachers will work collaboratively to generate project ideas to implement in the classroom to empower students to solve

real-world problems while aligning them with technology and priority standards. Teachers will brainstorm projects that they can implement in the classroom. Additionally, teachers will be given the PBL Brainstorming Template (See Appendix E). The brainstorming template will include the priority standards (NGSS), career pathways for student exploration, potential activities, and the essential questions. Then, teachers will create a more specific outline of the activities using the PBL Activity Template (See Appendix F). The template includes the information from the PBL Brainstorming Template with the addition of Stage 1: Desired Results, Stage 2: Evidence of Assessment, Stage 3: Plan Learning Experiences and Instruction. All these will be then combined for Day 3 of the professional development.

The final day will be an add-on from Day 2. Day 3 will be titled "Connecting It All." This day will be utilized for teachers to collaborate and lesson plan together. Teachers will include their work from Day 2 and include learning outcomes for their lesson. Once the teachers are done lesson planning, they will create a mini-presentation to share with the audience about their lesson ideas. At the end of Day 3, teachers will complete an evaluation form (see Appendix G) regarding the effectiveness of the 3-day professional development.

Needed Resources, Supports, and Potential Barriers

There are no particular resources needed for the professional development. The setting for the 3-day professional development will take place in one of the high school's cafeterias because the space is large enough for teachers to move around and collaborate. Additionally, the cafeterias are equipped with a sound system and a projector. The

cafeterias also have outlets that teachers can use to charge their laptops and have access to the internet. All the resources will be provided to teachers digitally on the first day via Google Drive (i.e., NGSS, priority standards, PBL Brainstorming Template, and PBL Activity Template). Furthermore, additional resources needed are easel papers and markers.

Administrative support would include assistance from the science program coordinator and administrators. These individuals are needed to provide support to teachers relating to the NGSS and priority standards. Administrators need to be present should an emergency occur to make immediate decisions.

There are two potential barriers to this professional development. The first one is teacher participation during the summer break. The professional development is set to take place over the summer, and teachers are not obligated to attend the professional development. One way to mitigate this barrier is to send a survey to prospective teachers to see if they are willing to join the professional development during their summer break. There are a total of 15 high school science teachers in the Western Pacific School District. There should be at least nine teachers, three per content (i.e., environmental science, biology, and chemistry), to run the professional development. If there are not enough teachers for the professional development during the summer break, then the leaders can decide to move the professional development days to the week when teachers report back, usually a week before the students report for the new school year. When teachers report back a week before the opening of the school year, the school district

usually provides a few days of professional development—reporting back a week before the students are usually the norm in the Western Pacific School District.

The second potential barrier to having the professional development over the summer is providing differential payments to teachers. In the Western Pacific School District, professional development that takes place during the weekend or on student-teacher breaks (e.g., winter break, spring break, and summer break), teachers are usually paid a differential. Should there be no funds to pay teachers during their summer break, the professional development will occur the week teachers report back to work before students. If the professional development takes place when teachers report back, then there is no need to pay teachers the differential.

Proposal for Implementation

The next step would be to speak with the science program coordinator and the school's administration team to discuss the execution of the 3-day professional development. We would schedule the 3-day professional development in June after reviewing my project recommendations. The 3-day professional development workshop will be held in June based on the survey results. If not enough teachers sign up in June, the professional development will be held in August after I graduate.

The project schedule calls for three whole days or eight hours of team planning workshops. Teachers will "unpack" the standards on the first day and select the content area's priority standards. After that, teachers will learn about PhET simulations and Nearpod. Teachers will be allowed to explore the digital tools' features and align them to the priority standards. On the second day, teachers will plan PBL projects. Teachers will

be given templates to help structure and organize their project ideas. On the third day, teachers will create a lesson plan and deliver it to their peers.

Administrators should meet with instructors monthly to monitor their progress. Similarly, teachers can submit status updates on their classroom's project implementations. If necessary, the administrative staff may use the monthly meetings to deliver feedback to teachers. Additionally, the administrative team is encouraged to plan three observations to observe lessons and projects in action. The observations will take place towards the end of every quarter, beginning with the second quarter of the school year. The first quarter of the school year will allow teachers to prepare and do a trial run. Administrative staff will provide feedback to teachers using a rubric.

Roles and Responsibilities of Stakeholders

As the researcher, my responsibility is to meet with administrators and the science program coordinator to discuss the best professional development plan for high school science teachers. Additionally, I will provide teachers with all necessary documentation and evaluations following each session. At the 3-day professional development, the science coordinator will serve as the lead facilitator. The administration will hold monthly meetings to monitor teacher progress. According to the Office of Curriculum and Instruction of the Western Pacific School District (n.d.), the scientific program coordinator offers teachers a variety of workshop opportunities, including classroom modeling, teacher coaching, and hands-on science lesson design. As such, it is appropriate for the science program coordinator to facilitate the 3-day professional development. As the high school science teachers unpack the standards, the science

program coordinator will be expected to demonstrate lessons and best practices for meeting the standards. Finally, both administrators and the coordinator of the scientific program will monitor the data. The data can be utilized to demonstrate how student achievement has increased in the classroom. Data collecting can provide evidence of a professional development program's effectiveness.

Apart from classroom observations, administrators will attend the same 3-day professional development to learn what is expected of teachers and foster collaboration between teachers and administrators. Administrators are also available to assist high school science teachers when they require assistance, whether in the form of materials and resources or emotional support and advice.

Finally, teachers play a critical role in the 3-day session as active participants. Additionally, teachers collaborate to develop lessons that equip students to be problem solvers and critical thinkers. Also, teachers' roles are to design lessons that allow students to hone skills necessary for college and career readiness. The teacher is responsible for developing lessons that are adaptable to the diverse group of students in the classroom.

Project Evaluation

According to Ford and Hewitt (2020), the two primary evaluation goals are formative and summative. Formative assessments are used to evaluate and assess professional growth and improvements, whereas summative assessments evaluate accountability and goal achievement (Ford & Hewitt, 2020). Likewise, Uzun and Ertok (2020) differentiated the two types of assessments where summative assessment examines students' achievements through exams and assessments. In this case, because

high school science teachers are the students of the 3-day professional development, they will complete a summative evaluation at the end of each day. On the other hand, formative assessment is viewed as a process that increases students' learning (Uzun & Ertok, 2020). The formative assessments of the 3-day professional development will include teacher collaboration and discussions.

The 3-day professional development will incorporate both formative and summative assessments. Formative assessments will be conducted during the 3-day workshops to ensure that teachers develop their curriculum with digital technologies and the PBL approach to increase student engagement and participation in the classroom. Additionally, formative assessments will determine whether teachers design courses that incorporate interaction, engagement and meaningful activities to help students better understand science concepts. Discussions, informal presentations, brief check-ins, and reflections are just a few activities used to assess teachers formatively. Furthermore, teachers will be assessed formatively through classroom observations using the PBL rubric. In terms of summative assessments, the teachers will assess the overall effectiveness of the professional development. The teachers will be given a link to complete at the end of each day. The professional development evaluation includes a Likert scale that asks teachers to evaluate three components: content, process, and context. Each component has a list of statements and teachers select from a range from strongly disagree to strongly agree. The daily evaluations will give the facilitator an idea of how effective the professional development is and what areas need improvement.

I picked formative evaluations because they provide quick feedback to the facilitator. The facilitator will gauge if the participants are grasping the material presented or if particular concepts need to be retaught. Summative assessments will inform the facilitator of the overall effectiveness of the professional development. Because the evaluation is created using Google form, the facilitator can link the teachers' responses to Google sheet to create various graphs for visual representations. The responses can be shown in percentages to see how teachers rated each component of the professional development.

Professional development should improve teacher knowledge and practice, and thus student outcomes. Bates and Morgan (2018) presented the seven elements for those interested in professional development can utilize them to evaluate their initiatives. The seven elements are 1) focus and science content, 2) active learning, 3) support for collaboration, 4) models of effective practice, 5) coaching and expert support, 6) feedback and reflection, and 7) sustained duration. Bates and Morgan emphasized that teacher professional development is tough on various levels. However, utilizing the factors may ensure that professional development planning and decisions are organized and purposeful. The goals of this professional development are to:

- Increase teacher knowledge about the importance of technology integration in science.
- Provide teachers with experiences to collaborate to create science lesson plans utilizing various technology tools.

- Provide teachers the opportunity to investigate and demonstrate technology tools to support instructional strategies to engage students.
- Provide teachers the opportunity to explore, identify, and integrate technology to enhance learning activities to meet learning objectives and science standards within their respective disciplines.
- Explore ways to integrate PhET simulation in the science classroom to assess student understanding of science-specific contents.
- Explore ways to incorporate Nearpod in the science classroom to assess student understanding and support student interaction and engagement.
- Plan and design project-based activities using the backward design framework.
- Incorporate digital tools into project-based lessons to promote collaboration and engagement in the science classroom.
- Design and create authentic lessons that incorporate the PBL approach to promote critical thinking and problem-solving skills.
- Design a lesson that integrates technology to promote active learning in the science classroom.

By incorporating Bates and Morgan's (2018) seven practical elements of professional development into my evaluation plan, I will demonstrate the impact of the professional development plan on teachers' ability to create lessons that incorporate digital tools. In addition to digital tools, the PBL approach enhances their content and increases student engagement and participation in the classroom. Additionally, the

evaluation methods should record teachers' opinions and perceptions of the professional development they received to improve their instructional delivery, engage students, and empower them to be critical thinkers and problem solvers. Furthermore, the PBL rubric will be used to measure gains in teachers' content knowledge.

The primary stakeholders are students, teachers, administrators, program coordinators, district officials, parents, and the community. As a result, it is critical to involve all stakeholders in decision-making regarding education and student progress. Stakeholders such as the director of the office of curriculum and instruction and the science program coordinator, that are involved in a student's growth and achievement should be appropriately informed. The Western Pacific School District communicates with stakeholders via email, automated push notifications, social media, school and district websites, and newsletters.

Project Implications

Rethinking science education is one possible form of social change. In this 3-day professional development, instructors will learn to use technology to improve science education and student accomplishment. Receiving feedback and reflecting on that feedback is crucial for teacher development and growth. If feedback is provided regarding practice and teachers do not reflect on it, there is a possibility that there will be no change or improvements (Bates & Morgan, 2018). Reflective practice means many things, but combining feedback and reflection can increase learning. When this happens, teachers see the impact of feedback on their teaching and student outcomes. At the end of the third day, the high school science teachers will receive a link to do a self-reflection

about the professional development. Additionally, the exercise will encourage teachers to continue reflecting on their practices using the skills from the professional development. The administrators will utilize the same reflection for teachers to complete at the end of each quarter as part of the observation.

This project aims to increase teacher awareness of the value of technology in science, allow instructors to collaborate on science lesson planning using various technology tools, and create meaningful science lessons to increase student engagement and outcomes. Because local stakeholders are responsible for students' success, teachers must be prepared with the knowledge and resources necessary to improve student outcomes and achievement. This professional development is necessary and critical to ensure that teachers continuously improve instructional practices to increase student learning and achievement.

Conclusion

After collecting data to explore how the teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training, the findings of this study revealed that teachers had a positive experience during their time in the ETTP. Although the findings revealed positive experiences, many of the participants revealed the need for content-specific technology training. Additionally, the participants of this study expressed the need for follow-up or continuous technology training or professional development to integrate technology with up-to-date digital tools. Therefore, it was appropriate to develop a 3-day professional development for high school science

teachers. In Section 3, I discussed the rationale, review of literature, project description, and the project evaluation plan. Section 4 of this project study will address the project's strengths and limitations, recommendations for alternative approaches, scholarship, professional development, leadership change, reflection on the importance of the work, implications, applications, and direction for future research.

Section 4: Reflections and Conclusions

The purpose of this basic qualitative study was to explore how teachers perceived the technology professional development program provided by the district and the experiences of teachers related to instructional technology after taking the district training. During data collection and analysis, I discovered a need for content-specific technology training for high school teachers. For this reason, I designed and created a 3-day professional development training to cater to the needs of high school teachers, particularly high school science teachers. The 3-day professional development was titled *Pedagogical Fusion: Integrating Technology and Project-Based Learning in Science*. In this final section of the study, I reflect on the project. Furthermore, I discuss the project's strengths and limitations, recommendations for alternative approaches, and scholarship and personal growth. Lastly, I reflect on the importance of the work, implications, applications, and directions for future research.

Project Strengths and Limitations

In this section of the study, I explain the project's strengths and limitations. The project's strengths focus on how the 3-day professional development enriches teachers' technological and instructional strategies through technology and PBL. Likewise, the project allows teachers to reflect on ways that the professional development can help them move their content forward and get valuable feedback from administrators. Finally, the limitations of the project are concentrated on possible reasons for low teacher participation due to timeframe, resistance from teachers, and funding. Although there are

some limitations to the project, solutions can be put in place to mitigate low teacher participation.

Strengths

One primary strength of this professional development plan is affording teachers the opportunity to participate in hands-on activities to develop their skills, further integrate technology, and implement the PBL approach in the classroom. Not only does the project provide high school teachers with hands-on activities, but teachers are also allowed to create a supportive learning community. Teachers who receive professional development that provides a hands-on and supportive environment are more confident and prepared to collaborate with students to solve problems in their classrooms (Havice et al., 2018). Furthermore, this professional development will allow teachers to collaborate to gain new and innovative strategies to implement in the classroom to engage students and promote active learning. Teachers will also be given a chance to create lessons that are meaningful and impactful for their students.

Another strength of this project is self-reflection and feedback. As part of the project to improve technology in science classrooms, administrators will observe teachers three times in the school year. The observation will allow teachers to self-reflect and improve their instructional strategies through constructive feedback provided by the administrators. The 3-day professional development will allow teachers to keep their teaching relevant and to improve student learning. Self-reflection is an essential part of the learning process, and it encourages teachers to transform their teaching strategies.

Furthermore, teachers are constantly seeking creative ways to promote learning in the classroom. Their actions are influenced by the knowledge and beliefs that they have gained over time through experience and professional development (Trinidad-Velasco & Reyes-Cárdenas, 2020). The 3-day professional development will give teachers insights into new strategies that have been vetted through research. Additionally, professional development gives teachers opportunities to reflect and identify their needs and take ownership through collaboration and hands-on activities (Davis & McDonald, 2019).

Limitations

There are three limitations of this project. The first limitation is the timeframe when the professional development is slated to start. The intended date for this 3-day professional development is during the summer. Teachers may resist attending the professional development during the summer because they are not obligated to come to work. Because teachers are not obligated to work during the summer, teacher participation may be low.

The second limitation to this project may be resistance from teachers toward integrating technology in their science classrooms. According to Davis (1989), the TAM focuses on two constructs, perceived usefulness and perceived ease of use. The TAM determines the likelihood of users—in this case, high school science teachers—accepting technology in their classrooms. Some teachers may perceive technology as not having an impact on their teaching, believing that their instructional strategies are effective enough and that there is no need to reinvent the wheel. For this reason, teacher participation may be low.

The third limitation of this project is funding. As mentioned, teachers are not obligated to work during the summer. Therefore, those teachers who are willing to participate must be compensated. The Western Pacific Region School District pays teachers a differential anytime they attend workshops or professional development during weekends and breaks. Because the project is slated to start in the summer, teachers need to get paid for attending the 3-day professional development.

Recommendations for Alternative Approaches

One of the major themes that emerged from the data collection was the need for content-specific technology training. Because high school teachers felt that they needed more technology training relating to their content area, I proposed a 3-day professional development to assist high school science teachers in this area. One recommendation would be to include teachers in other content areas, not just high school science teachers. The administrators can create workshops each semester in which content-specific teachers (i.e., science, social studies, English language arts, physical education and health, arts) can collaboratively create innovative and impactful lessons with technology integration.

One way to do this would be to use the time when teachers report back to work. Teachers typically report back a week before students enter the campus. The administrators can hold half-day sessions that allow teachers to collaborate and share ideas and instructional strategies to implement in their classrooms. The great thing about this is that it would allow them to horizontally plan and align their instructions and assessments with one another. The other segment of this session could take place the

week before summer ends. At this time, the students would be out for summer, and teachers would be attending professional development. The teachers could come back and discuss which strategies worked and which did not and plan purposefully for the next school year. Furthermore, at this time, teachers could have data to help them plan accordingly and effectively.

Scholarship, Project Development, and Leadership Change

The journey of completing a scholarly project study and planning for a 3-day professional development project has been challenging. However, it has also been an eye-opening experience as a novice researcher. The initial courses that I completed were the impetus of this project study. Through the development of the project study, I learned the details and intricacies of conducting a basic qualitative study. Choosing to conduct a basic qualitative study allowed me to understand the problem through the participants' lens. The process allowed me to be objective and to set aside my biases.

Furthermore, I learned to collect quality data that helped me uncover more information about the needs of teachers after completing the ETTP. Although this was the most challenging task of the study, it was the most rewarding and exciting. I got to listen to teachers tell their experiences as participants of the ETTP. The transcribing and coding process was where the study got critical. I felt that it was critical because I had to ensure that I retold the participants' experiences accurately. The coding process was time consuming; however, it allowed me to understand the problem more deeply. I was also able to ensure that the information provided was credible through member checking. After receiving feedback from the participants, I revisited the data to ensure that I

reached saturation. I began to connect ideas and information, and the themes emerged from the data, making planning the project more manageable.

Planning for the project was another eye-opening experience for me as a novice researcher. Frequently, administrators and leaders decide what professional development should be presented to teachers and mandate teachers to attend. However, most of these sessions do not positively affect teachers' pedagogy (Martin et al., 2019). Teachers should be allowed to transform and lead education, as they are experts in teaching and learning. While teaching and planning are not easy feats, teachers should be supported by allowing them to collaborate to plan and create meaningful, practical, and impactful lessons. The 3-day professional development was developed for that very reason—to allow teachers to work together and share ideas.

As a scholar and practitioner, I found this experience fulfilling. It allowed me to understand the importance of research and how problems should always be solved through data, not opinions or personal experiences. Through the collection of data, I put this project together to help teachers become agents of change in their classrooms. Moreover, developing the project has shown me practical ways to plan and deliver professional development.

Reflection on the Importance of the Work

The problem is that district administrators implemented the ETTP to improve technology integration in the classroom as measured by the ELEOT. However, there was no follow-up to determine how the teachers perceived the district's technology professional development program and the teachers' experiences related to instructional

technology after taking the district training. Through interviews, I was able to unravel important information about the problem. The participants shared that the ETTP had equipped them with tools; however, there is a need for content-specific and continuous professional development to integrate technology relevant to their content.

Numerous educational scholars have focused on and will continue to focus on the integration of technology in education. Providing technology training and support to teachers is also a primary objective in my career as an educator. That was one of the reasons that I chose to do a 3-day professional development. Furthermore, I would like to help the other content areas (i.e., math, social studies, ELA) create similar professional development to increase content-specific tools in the classrooms. Professional development can help enhance lessons and motivate students to become active learners and engaged.

My goal in promoting social change in the school district is to bring awareness of the importance and possibilities of integrating technology. Additionally, I would like to continue advocating for and promoting the use of technology within the school district, even if it means starting with one school. If provided with the opportunity to learn new technology tools, teachers can better serve students by implementing current research-based practices that incorporate technology to assist students in excelling and, more importantly, in becoming college and career ready. Moreover, the project will allow teachers to explore and work collaboratively to create authentic and meaningful lessons. When teachers know how to use technology successfully, it fosters learning in the classroom and can help teachers better serve their students (Lee, 2018).

Implications, Applications, and Directions for Future Research

In this basic qualitative study, I explored how high school teachers perceived the technology professional development program provided by the district and the experiences of high school teachers related to instructional technology after taking the district training. One of the themes that emerged from the findings was the need for content-specific technology training. Because of the need for content-specific training, it was appropriate to plan and design a 3-day professional development that would assist teachers in planning for a more meaningful and engaging lesson through digital tools and PBL. The project would promote social change within the high school science department to improve teaching and learning in classrooms.

The purpose of this 3-day professional development is to increase teacher awareness of the value of technology in science, allow instructors to collaborate on science lesson planning using various technology tools, and create meaningful science lessons to increase student engagement and improve outcomes. A recommendation for future practice is to create content-specific technology training for the other content areas. The same framework of the professional development dedicated to high school science can be modified to meet the needs of other content areas. The integration of technology and PBL among all content areas could significantly impact student learning across high school and the curriculum.

Conclusion

Through the data collection and analysis, many high school teachers expressed their appreciation of the ETTP for allowing them to learn new teaching strategies and

technology tools to incorporate in their classrooms. Although they can add more tools to their toolbox of technology tools, the findings revealed a dearth of content-specific technology tools and professional development. The project presented in Appendix A will allow teachers to collaborate and utilize more technology to improve classroom teaching and learning.

Although this experience was challenging, there are many valuable skills that I have taken away from completing a project study. The most remarkable skill that I learned was conducting a qualitative study. I managed to listen to 13 participants share their stories and experiences while in the ETTP. I learned to listen to the participants and set aside my personal feelings as I was also a member of the ETTP. I learned to code important information and to set aside responses that needed more analysis. Finally, I learned to connect the dots to categorize the codes into themes.

Lastly, the whole process of completing a project study opened my eyes to many things I did not know, one of them being negative implications. While positive implications are a great way to strengthen a study, negative implications are also essential to consider. When I discovered teachers' negative perceptions of the ETTP, I decided to overturn these feelings by developing a content-specific professional development.

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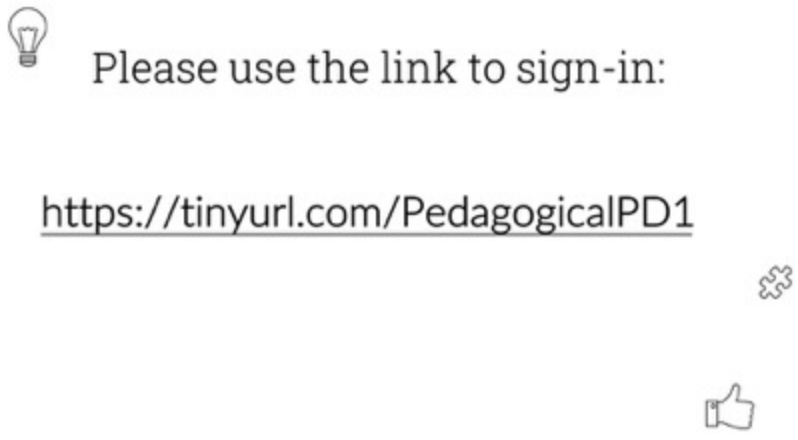
Appendix A: Project Study




Welcoming
Remarks
Science Program
Coordinator


Day 1:
"Technology
Refine: PhET and
Nearpod"

Day 1 Agenda

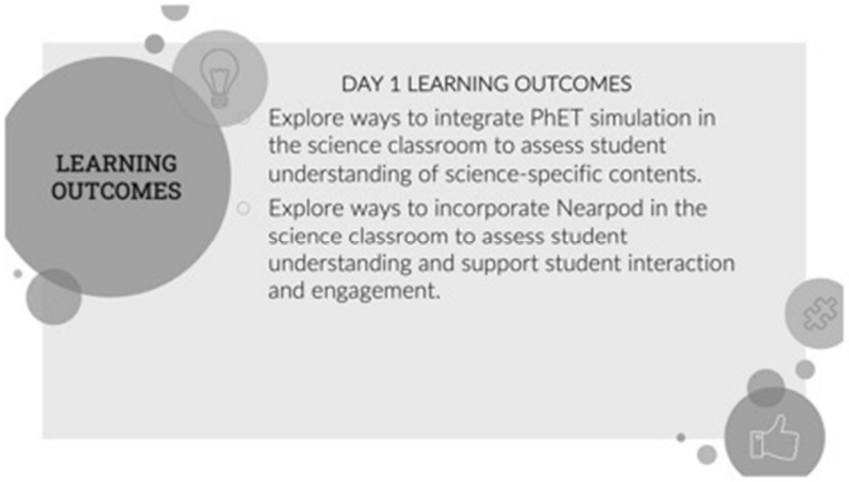
Day 1: Technology Refine: PhET and Nearpod	
8:30 am – 9:00 am	Breakfast and Sign-in
9:00 am – 9:15 am	Welcoming Remarks (Science Coordinator)
9:15 am – 10:15 am	Breakout Session: Unpacking the NGSS and Priority Standards
10:15 am – 11:45 am	Introduction to PhET Simulations
11:45 am – 12:00 pm	Break
12:00 pm – 12:30 pm	Exploring PhET Simulations (Collaborative Activity)
12:30 pm – 1:30 pm	Lunch on your own
1:30 pm – 3:00 pm	Introduction to Nearpod
3:00 pm – 4:00 pm	Exploring Nearpod (Collaborative Activity)
4:00 pm – 4:30 pm	Wrap-up! Complete Day 1 Evaluation and Sign-out

“

PURPOSE:

“The purpose of this three-day professional development is to increase teacher awareness of the value of technology in science, allow instructors to collaborate on science lesson planning using various technology tools, and to create meaningful science lessons to increase student engagement and outcomes.”


GOALS
Professional Development Goals:
Increase teacher knowledge about the importance of technology integration in science.
Provide teachers with experiences to collaborate to create science lesson plans utilizing various technology tools.
Provide teachers the opportunity to investigate and demonstrate technology tools to support instructional strategies to engage students.
Provide teachers the opportunity to explore, identify, and integrate technology to enhance learning activities to meet learning objectives and science standards within their respective disciplines.


LEARNING OUTCOMES
DAY 1 LEARNING OUTCOMES
Explore ways to integrate PhET simulation in the science classroom to assess student understanding of science-specific contents.
Explore ways to incorporate Nearpod in the science classroom to assess student understanding and support student interaction and engagement.

UNPACKING THE PRIORITY STANDARDS

Breakout Session

- Breakout into content-specific (i.e., Environmental Science, Biology, and Chemistry).
- Introduction:
  - Name
  - School
  - What is your favorite animal and why?

What does it mean to "Unpack Standards"?

Tannehill and Lund (2005) defined unpacking standards as clarifying "what they mean, in order to determine how they might be best achieved and student success measured" (p. 18).

Unpacking a standard involves analyzing its language in order to uncover clues describing two aspects of the standard that students must understand: essential knowledge and essential competencies (Sterling, 2014).

Unpacking the Priority Standards

- You will need your laptop for this activity.
- Please access your content's priority standards on Google Drive:
  - https://tinyurl.com/prioritystandards1

Collaborative Activity

- In your groups select one of the priority standards.
- Discuss the components of the templates and what they mean to you.
- Complete the template:
  - https://tinyurl.com/ngsscopy1
- Upload the completed template it to Google Drive and follow the format:
  - Content_UnpackingNGSS (e.g., Chemistry_UnpackingNGSS)
  - https://tinyurl.com/ngsstemplate1

What is PhET?

(PhET Simulations, 2018)

PhET Homepage

What simulations do they have?

Browsing and Filtering

PhET allows you to browse and filter simulations based on your needs and content.

Notable Features

Tips for Teachers

Activities!

Translations

What are the benefits of PhET?

What research says about PhET?

- PhET simulations can foster active learning and promote 21st century skills in the classrooms as students explore natural phenomena (Akinwale & Kehinde, 2017).
- PhET guides inquiry activities and assists students in learning and applying numerous science principles promoted by NGSS (Bennett & Boesdorfer, 2020).
- Increases scientific cooperation among students (Astutik and Prahani, 2018).
- PhET simulation improved students' conceptual knowledge and motivation more than those taught without using the simulation (Prima et al., 2018).

“

Break Time!

15 minutes

Collaborative Activity

Explore PhET Simulations:

- Browse and explore simulations that align to your content's priority standard.
- Browse the Activities Section to see if it aligns with your priority standards.
- Discuss ways you will utilize the simulation in your classroom.


Lunch Time!
1 hour

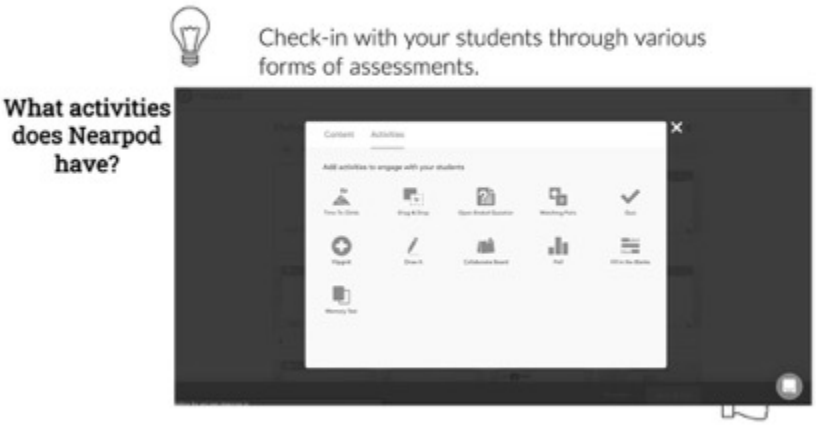

Introduction to
nearpod
An Interactive Learning Tool

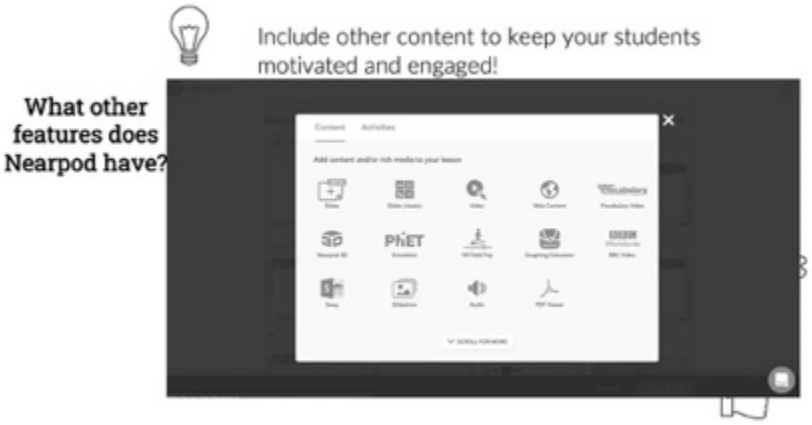
What is Nearpod?

Nearpod Homepage


Already have a PowerPoint or Google Slide? Nearpod allows you to upload it.
You can browse and search for premade lessons created by other teachers.
Creating Lessons
Search for pre-made lessons
Create Lessons From Scratch
EXPLORE THE NEARPOD LIBRARY
Create a Lesson
ICEBREAKERS: CLASSMATE BINGO

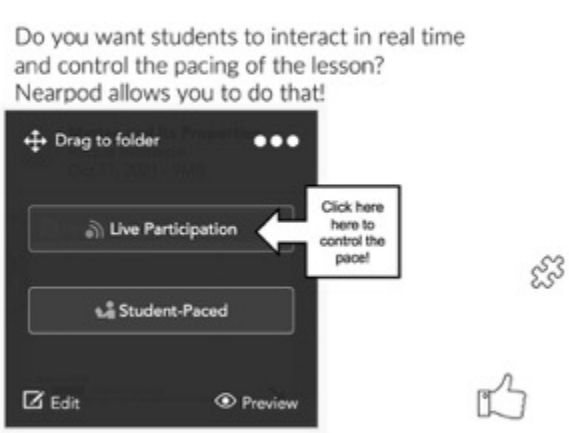

You can automatically install Nearpod as an add-on in Google Slides!
Nearpod a an add-on
Click here to add Nearpod as an add-on

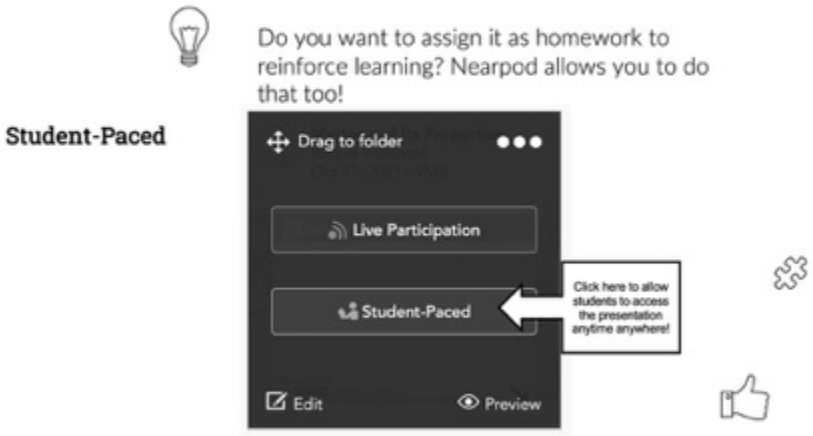

Check-in with your students through various forms of assessments.
What activities does Nearpod have?


Include other content to keep your students motivated and engaged!
What other features does Nearpod have?

Embed PhET

Real Time




Do you want to assign it as homework to reinforce learning? Nearpod allows you to do that too!
Student-Paced
Drag to folder
Live Participation
Student-Paced
Click here to allow students to access the presentation anytime anywhere!
Edit
Preview


Explore
nearpod
An Interactive Learning Tool

Collaborative Activity

Explore Nearpod:

- Create your free account and install add-ons to your Google Slide.
- Discuss ways you will utilize this interactive tool in your classroom.

What are the benefits of Nearpod?

What research says about Nearpod?

- Nearpod is a cheap and easy-to-use interactive student engagement–learning tool where faculty can support active learning through quizzing, polling, gamified activities, interactive video, and collaborative boards (Sarginson & McPherson, 2021).
- Nearpod may easily be implemented into the classroom to help students learn and manipulate content while also helping teachers collect data (Dunbar, 2016).
- The data showed that all students found this form of guided reading helpful and inspiring in learning the application's content. Students also discussed how they could apply their learning in their own work. However, great study and planning must be done to ensure the technology works effectively during guided reading. The Nearpod app is recommended for guided reading lessons because it is user-friendly, engaging, and tracks student progress (Delacruz, 2014).

Day 1 Closure:

Please use the link to complete
Day 1 Professional
Development Evaluation:

https://tinyurl.com/pdeval670

Please use the link to sign-out:

https://tinyurl.com/PedagogicalPD1

Day 2: “Pioneer Learning Through PBL”

Please use the link to sign-in:

https://tinyurl.com/PedagogicalPD1

Day 2 Agenda

Day 2: Pioneering Learning Through PBL	
8:30 am – 9:00 am	Breakfast and Sign-in
9:00 am – 10:00 am	What is PBL?
10:00 am – 11:00 am	Brainstorming Activities for PBL & Aligning to Priority Standards
11:00 am – 11:15 am	Break
11:15 am – 12:30 pm	Discussions, Questions, and Clarifications; Introduce PBL Activity Template
12:30 pm – 1:30 pm	Lunch on your own
1:30 pm – 2:00 pm	PBL Activity Template: Stage 1 – Desired Results
2:00 pm – 2:30 pm	PBL Activity Template: Stage 2 – Evidence of Assessments
2:30 pm – 4:00 pm	PBL Activity Template: Stage 3 – Plan Learning Experiences and Instruction
4:00 pm – 4:30 pm	Wrap-up! Complete Day 2 Evaluation and Sign-out

LEARNING OUTCOMES

DAY 2 LEARNING OUTCOMES

- Plan and design project-based activities using the Backward Design Framework.
- Incorporate digital tools into project-based lessons to promote collaboration and engagement in the science classroom.

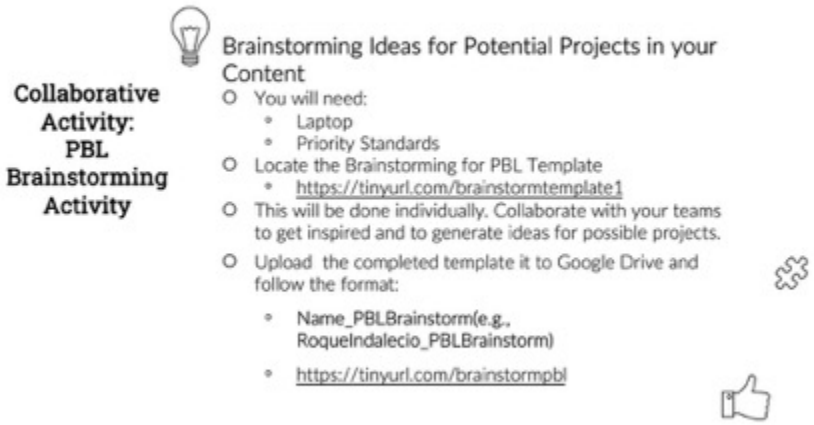
Collaborative Activity

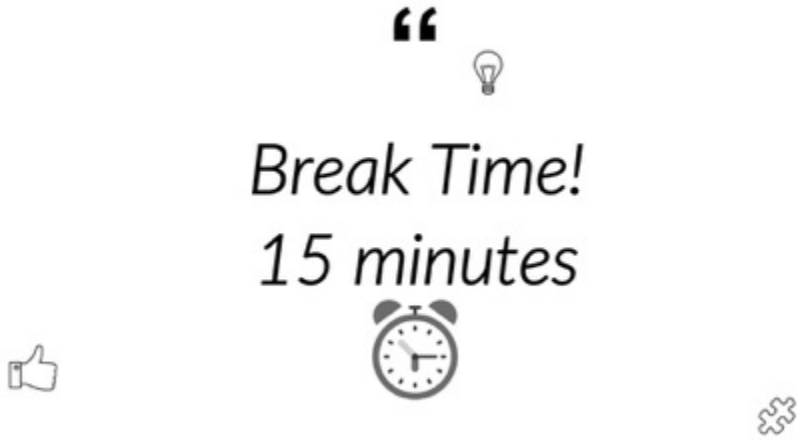
- Breakout into content-specific groups.
- Group Discussion:
  - What does PBL mean to you?
  - How does it look like in a classroom setting?
  - What are your experiences implementing PBL in your classrooms?
  - What are some projects that your students completed in your classroom?
  - What were some observations you made regarding student participation, reaction, comments, etc. about the activity?

What is PBL?

- Project-based learning (PBL) is defined as learning-centered projects involving students in investigations (Choi et al., 2019).
- Project-based learning (PBL) is a teaching method that involves students in real-world projects. (PBL Works, n.d.)

(Common Sense Education, 2016)


Collaborative Activity: PBL Brainstorming Activity
Brainstorming Ideas for Potential Projects in your Content
You will need:
Laptop
Priority Standards
Locate the Brainstorming for PBL Template
https://tinyurl.com/brainstormtemplate1
This will be done individually. Collaborate with your teams to get inspired and to generate ideas for possible projects.
Upload the completed template it to Google Drive and follow the format:
Name_PBLBrainstorm(e.g., RoqueIndalecio_PBLBrainstorm)
https://tinyurl.com/brainstormpbl


“
Break Time!
15 minutes


Discussions, Questions, and Clarifications
Q
A

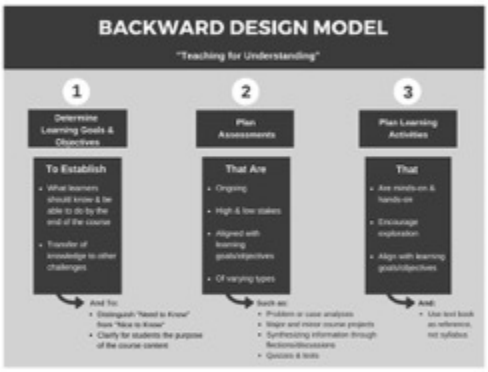

Lunch Time!
1 hour

Collaborative Activity: PBL Activity Template

Brainstorming Ideas for Potential Projects in your Content

- You will need:
  - Laptop
  - Priority Standards
  - Brainstorm Template
- Locate the PBL Template
  - https://tinyurl.com/pblactivity2
- This will be done individually. Collaborate with your teams to get inspired and to generate ideas for possible projects.
- Upload the completed template it to Google Drive and follow the format:
  - Name_PBLActivity(e.g., RoqueIndalecio_PBLActivity)
  - https://tinyurl.com/pblactivityfolder2

Backward Design Model



Complete Stage 1 of the PBL Activity Template

Stage 1: Desired Results

- Essential Questions
- Project Goals

Complete Stage 2 of the PBL Activity Template

Stage 2: Evidence of Assessments

- Student Products
- Performance Tasks
- Evaluation
- Collection of Evidence

Stage 3: Plan Learning Experiences and Instructions

Complete Stage 3 of the PBL Activity Template

- Activity Elements
- Sequence and Timeframe
- Materials and Resources
- Instructional Strategies
- Technology/Digital Tool Integration

Day 2 Closure:

Please use the link to complete Day 1 Professional Development Evaluation:

https://tinyurl.com/pdeval670

Please use the link to sign-out:

https://tinyurl.com/PedagogicalPD1

Day 3: "Connecting It All"

Please use the link to sign-in:

https://tinyurl.com/PedagogicalPD1

Day 3 Agenda

Day 3: Connecting It All	
8:30 am – 9:00 am	Breakfast and Sign-in
9:00 am – 11:45 am	Lesson Planning
11:45 am – 12:00 pm	Break
12:00 pm – 12:30 pm	Discussions, Questions, and Clarifications regarding Lesson Planning
12:30 pm – 1:30 pm	Lunch on your own
1:30 pm – 2:00 pm	Create of Presentation
2:00 pm – 4:00 pm	Project Presentations
4:00 pm – 4:30 pm	Wrap-up! Complete Day 3 Evaluation and Sign-out

LEARNING OUTCOMES

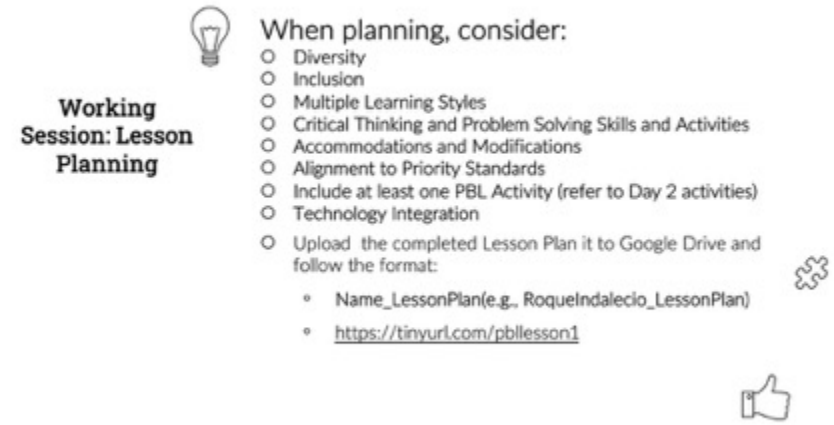
DAY 3 LEARNING OUTCOMES

- Design and create authentic lessons that incorporate the Project-Based Learning approach to promote critical thinking and problem-solving skills.
- Design lesson that integrates technology to promote active learning in the science classroom.

Working Session: Lesson Planning

Breakout into content-specific groups
You will need:

- Priority Standards
- PBL Brainstorm and Activity Templates
- Laptop
- UbD Template (Use your school's template)


Working Session: Lesson Planning
When planning, consider:
Diversity
Inclusion
Multiple Learning Styles
Critical Thinking and Problem Solving Skills and Activities
Accommodations and Modifications
Alignment to Priority Standards
Include at least one PBL Activity (refer to Day 2 activities)
Technology Integration
Upload the completed Lesson Plan it to Google Drive and follow the format:
Name_LessonPlan(e.g., RoqueIndalecio_LessonPlan)
https://tinyurl.com/pbllesson1


“
Break Time!
15 minutes


Discussions, Questions, and Clarifications
Q
A


Lunch Time!
1 hour

Creating a synopsis of your PBL Lesson
You may used any presentation tools

Creating a Presentation

Presentation should include:

- Priority Standards
- Career Pathway
- Essential Questions
- Learning Outcomes
- Breakdown of Project and Timeline
- Student Products
- What tech tools are involved in the PBL?
- Assessments: Formative/Summative
- Upload the completed template it to Google Drive and follow the format:
  - Name_PBLPresentation(e.g., RoqueIndalecio_PBLPresentation)
  - https://tinyurl.com/pblactivityfolder2

“

Presentation of PBL Lesson and Activities

Day 3 Closure:

Please use the link to complete
Day 1 Professional
Development Evaluation:

https://tinyurl.com/pdeval670

https://tinyurl.com/teacherreflect1

Reference

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Appendix B: Teacher Interview Questions

1. What is your position in the Western Pacific Region School District?

2. How long have you been a teacher?

3. What content do you teach?

4. Have you completed the Educational Technology Training for Teachers?

5. Were you informed about the technology training for teachers? How (ex. Email, flyers, administrators, colleagues, etc.)?

6. What year did you complete the training?

7. Aside from the Educational Technology Training for Teachers, have you attended or completed any other technology training for teachers? If yes, when did you complete it? How long did the training take? Was the training provided by the school district? If no, did you have to pay for it?

Please describe your experiences using technology in the classroom.
Prompts:

8. What tools do you use related to your content area?
9. How confident were you in integrating technology before completing the program?
10. How often did you use technology?
11. Did you receive assistance from your school regarding integrating technology in the classroom?
12. How did your school offer support, such as professional developments on effective ways to implement technology?
13. How confident were you in integrating technology after completing the program?
14. How often did you use technology?
15. What are some types of technology you use in your classroom?
16. What are some technology tools you use in your classroom (ex. Google Docs, google form, kahoot, etc.)?

17. Please describe your experience when you were completing the technology training for teachers. (Example: you can share your experience about the core courses, the instructors, the technology tools the program introduced, etc.)

18. Describe your beliefs, attitudes, and perception about technology integration in the classrooms before completing the professional development.

19. Describe your beliefs, attitudes, and perception about technology integration in the classroom after completing the professional development.

20. Explain any barriers that may have prevented you from effectively integrating technology in the classroom.

21. Were the courses offered relevant to your line of work as a teacher?

22. Please describe any challenges you faced during the technology training for teachers.

23. How would teachers and staff benefit from completing the educational technology training program?

24. Please provide any additional information or experiences you have about integrating technology in your classroom.

25. Please provide any additional information or experiences while you were in the technology training for teachers.

26. Do you think you still need support in regards to technology integration?

27. How can your administrator(s) and the key management leaders (Commissioner of Education, Associate Commissioner, Technology Director, Program Directors, etc.) continue to support you in regards to the integrating technology in your classroom effectively?

Thank you for your participation in this study. Once I have transcribed the interview transcript and field notes. I will contact you to ask for your feedback.

Appendix C: Table of Codes, Code Definitions, Categories, and Themes

Research Questions and Interview Questions RQ1: How do teachers perceive the technology professional development program provided by the district? RQ2: What are the experiences of teachers related to instructional technology after taking the district training?	Definition of codes	Codes	Additional Information	Categories and Themes **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD** **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**
1. What is your position in the Western Pacific Region School District?		Chemistry teacher, classroom teacher, Science Educator, Classroom Teacher, Classroom Teacher, Sophomore U.S. History, Teacher, Teacher at Marianas High School, Language Arts Teacher, Science Teacher, LA 1 Teacher, Classroom teacher		High School Teachers
2. How long have you been a teacher?		19 years. 23 years, 10 years, 11 years, 5 years, 19 years, 4 years, 3 years, 5 years going on 6th year, 5 years, 17 years, 20 years and 6 months, 5 years		
3. What content do you teach?		Chemistry, Mathematics and one English Class, Algebra 2 & AP Computer Science, Chemistry Honors; Honors Physics; Environmental and Biology, Language Arts for 10th Grade, Language Arts, U.S. History, Biology and a section of reading, English Language Arts, The Content is ELA, Chemistry and AP Chem, LA 1, 10th Grade English		**Core Content Areas:** defined domain of knowledge and skill in an academic program including English Language Arts, Math, Science, and Social Studies (History or Civics)
4. Have you completed the Educational Technology Training for Teachers?		Yes		
5. Were you informed about fathe technology training for teachers? How (ex. Email, flyers, administrators, colleagues, etc.)?	***Colleagues:** Heard about the ETTP through coworkers/colleagues. ***Administrator:** Informed about the	Colleagues, Administrator, Email, Word of mouth (heard people talking about it)		

	ETTP from Administrator. ***Email:** Learned about the ETTP through a broadcasted email,			
6. What year did you complete the training?		2019, don't recall, 2013, 2021, it's been a long time, 2013-2014, 2017, School Year 2015-2016, SY 2019-2020, 2020, 2015, 2019, 2021		
RQ2 7. Aside from the Educational Technology Training for Teachers, have you attended or completed any other technology training for teachers? If yes, when did you complete it? How long did the training take? Was the training provided by the school district? If no, did you have to pay for it?	***Other Training/PD:** These are Training or Professional Development participants attended aside from the Educational Technology Training Program (ETTP). ***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom ***District-Provided PDs and Training:** These were offered and paid for by either school funds/district funds. ***Self-Paid:** Used personal funds to take courses or training relating to technology. ***College:** Took some educational technology courses in college. ***Vernier:** Software and Technology that supports teacher sciences. ***PhET:** Interactive simulations from the University of Colorado, Boulder ***NoRedInk:** web-based language-learning platform. ***BlackBoard:** The endorsed Learning Management System that the school district is currently using for blended learning. This includes getting trained to set up virtual classes on BB. ***Nearpod:** a website and app-based digital tool that lets teachers create slide-based learning resources that are interactive for	• Other Training/PD • School-Provided Programs • Self-Paid • District Provided PDs and Training • College • Vernier • PhET • NoRedInk • BlackBoard • Nearpod • Can't remember • Specific to Content • Star • Achieve 3000 •	Master's Program (took a course during Master's Program/Graduate School), Used personal funds, paid by district Achieve 3000 (supplemental online resource to promote literacy across the curriculum), Texas Instrument (calculators), Microscopes (received training at one point on how to integrate and use digital microscopes), BlackBoard Learn and Ultra (type of Learning Management System), International Society for Technology in Education (ISTE), Model School Conference (future-focused leaders and teachers to share innovative practices to then	**Additional Technology Training:** Participants received training or attended professional development relating to technology. Most trainings were provided by the school district and is not part of the Educational Technology Training Program. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD**

	students to engage with and learn from. ***Can't remember:** does not recall all of the trainings or professional development attended. ***Specific to Content:** any training related to content. ***Computer Technology:** Professional development course offered by the school district for teachers ***Star:** computer-adaptive test that measures achievement on reading skills ***Achieve 3000:** online resource to promote literacy		replicate in halls and classrooms across the country), Took PDs relating to technology, Advanced Placement (AP) Conference, iNACOL (International Association for K-12 Online Learning), Renaissance (software; learning analytics; pre K-12 assessments), Took some courses in Cal State, LA, Computer programming course, ISTE, distance education training for online courses, other technology course (offered by a teacher), class at the Northern Marianas College (prerequisite), media course (Master's program), NoRedInk, Renaissance, Quizlet, Quizizz, Houghton Mifflin Harcourt (HMH; online access to textbooks as well as interactive	

			workbooks), BlackBoard; received training on how to navigate it, attended a variety but can't recall, BlackBoard Ultra, no training specific to content, 5 week course Professional Development,	
RQ2 8. Please describe your experiences using technology in the classroom. What tools do you use related to your content area??	***Usage:** The use of technology in terms of frequency and usage overall. ***Pre-Pandemic:** before the Pandemic (COVID-19) and the shift towards virtual and blended learning. ***LMS:** Learning Management System. ***Tech Tools:** a variety of technological tools participants used and integrated in their classroom. ***Blended Learning/Hybrid:** approach that combines both technology/virtual and traditional face-to-face teaching. ***Communication tools:** Applications or technological tools used to communicate with students. ***Note-taking Tools:** Applications or tools used for students to take notes or a way for teachers to display and present notes. ***Screencasts:** screen recording of a screen of a computer, laptop, mobile device, tablet, etc. ***District-Provided Tools:** tools or applications that are paid for by the school district. This is different from school-	• Usage • Pre-pandemic • LMS • Tech Tools • Blended Learning/Hybrid • Communication Tools • Note-taking tools • Screencasts • District-Provided Tools • Hardware • Student Use • Pandemic • Web-based tools • Technology is embedded • Google Apps • Building a community • Community of Teachers • Barriers, Socio-economic • Student Engagement • Positive Experience • Coding Software • Word processing • Vernier Software • Interactive Whiteboard • Science Tools • Technology Integration • Frequent • Collaboration • Game-based Learning • Student Engagement	Uses it extensively, Edmodo, Communication Tools, Flipped Classroom Approach, Note-taking tools, Show Me, Notability, Screen casting, Screencast-o-matic, calculators, document cameras, TV, iPad, Student engagement, student use, Web-based tools, Khan Academy, College Board, AP Seminar, Computers, Grading System, Geometer Sketchpad (GSP), Google Suite, Google Classroom, Google Slides, Google Docs, Canva, Video Animations, WhatsApp, Struggle building a community, Teacher of the	**Technology is Embedded:** teachers use various pieces of technology ranging from basic to sophisticated technology. **General Application:** the tools integrated in the classroom are more for general use and nothing specific to content areas. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD** **Theme 4: Teachers Learn New Tools**

	provided (school uses their funds). ***Hardware:** Physical and tangible technology. ***Student Use:** students using technology. ***Pandemic:** because of COVID-19, the school district shifted to virtual then blended-learning. ***Web-based Tools:** software, applications, websites that runs on web browsers and require internet connection. ***Technology is Embedded:** uses various of technology frequently and is embedded into lessons and content. ***Google Apps:** Applications created by Google such as Google docs, sheet, forms, slides, Gmail, etc. ***Building a community:** having students actively engaged and learning from one another. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***Barriers:** experienced challenges working at a public school with regards to technology. ***Socio-economic:** students coming from different income brackets; students coming from lower income do not have access to technology at home as well as internet connection. ***Accommodation:** Accommodated every student relating to technology; ensures everyone has access to do projects and assignments; the use of technology is not mandatory at home. ***Student Engagement:**	• Relevant, Resources • Experience • Limit • Anonymous • Clever • Microsoft Office • Competent • Time • TOW • Google Classroom • Weebly • Interactive Web Pages • PHET • Graphic Design Platforms • BlackBoard • Presentation Software • Game-based learning • Storybird • Note-taking tools • Student engagement • Uncertainty • Adapting • Positive Change • Efficiency • Applicable	Year Cohort, BlackBoard, Accommodated students with no access to devices at home, students are eager to learn and use technology, inspiring, project-based, Blue Jay, Create algorithms, robots, manipulate codes, YouTube, Graphic Design Platform, word processing for data collection, stand-alone probes, wind meter, binoculars (for bird watching), well integrated into science curriculum, supply room (roller coaster materials for physics), uses a variety of tech tools, technology promotes collaboration, makes lessons fun and engaging, game-based learning; kahoot; quizizz, Experience; ETTP gave her additional resources to use in the classroom, participants during her time were advised to limit the amount of use of technology	

	Engaging student; getting their attention; learning; curiosity. ***Positive Experience:** positive experience using technology in the classroom. ***Coding Software:** software used to for coding in Computer Science. ***Word Processing:** a program or software used for editing texts. ***Vernier Software:** Science technology provided by Vernier (probes, scales, etc.). ***Interactive Whiteboards:** a large interactive display board/screen. ***Science Tools:** a variety of scientific tools (scales, probes, etc.) ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Frequent:** Uses technology frequently in the classroom. ***Collaboration:** working together to create or achieve something. ***Game-based Learning:** an active learning technique where games are used to enhance student learning. ***Relevant:** integrating technology to lesson; cohesive; flow. ***Resources:** additional materials that can be used in the classroom to enhance the lesson in the form of technology or technological tools. ***Experience:** encounters during their time in the ETTP; overall experience. ***Limit:** to have a certain point where you do not exceed the use of technology in the classroom; to not		to prevent overwhelming students; to slowly ease students into using it; choose one tools and have students adapt to it; after, you start to add more, Quizizz, Quizlet, Padlet, Blackboard, Google Apps, Allows students to respond anonymously because some students are shy or afraid to share, Clever; where students can access different learning platforms; houses all other accounts, relies on visuals; projector, laptops; research purposes, cellphones; research and assignments; blended learning, PowerPoint, videos, uses laptops and cellphone to search terms, cellphones; game-based learning, Canva, google docs, google platform, Blackboard, Mentee Game System, Jeopardy (ppt), YouTube, uses the projector a lot, ELMO; uses it a lot, clickers,	

	overuse it in the classroom. ***Anonymous**: a website where students can answer questions anonymously. ***Clever:** a digital learning platform for K-12 schools. ***Microsoft Office:** software developed by Microsoft which includes Microsoft Word, PowerPoint, Outlook, Excel, Publisher, etc. ***Competent:** has necessary ability, knowledge, and skills using technology. ***Time:** it takes time to get used to new software. ***TOW:** Technology on Wheels. Laptops that are stored in carts with wheels. ***Google Classroom:** a free web service developed by Google for schools that aims to simplify creating, distributing, and grading assignments. ***Weebly:** Free website builder ***Interactive Web Pages:** interactive website that allows communication and interaction with users ***Graphic Design Platforms:** online tools that students can use to create graphics such as posters, infographics, flyers, etc. ***PhET:** Interactive simulations from the University of Colorado, Boulder. Learning ***BlackBoard:** The endorsed Learning Management System that the school district is currently using for blended learning. This includes getting trained to set up virtual classes on BB. ***Presentation Programs:** software that is used to create presentation slides.		iPads, microscope, using a computer is easy for her, it's easy to use the hardware; with software it takes time for her to get used to it; explore; play around; once she gets the hang of it; it's easy for her, she's not worried because once she gets it' she'll be okay. Has TOWs in her classrooms; students use the laptops of every day in place of paper, everything was in Google classroom; then everything was done in BBU; technology is an everyday thing in her class; Achieve 3000, NoRedInk, Renaissance Learning; STAR Reading, utilizes Google apps for writing, making presentation, and other assignments; uses a lot of Google docs and slides, Easel.ly, clickers, PHET for virtual labs and simulations for AP chem to replace actual lab (no	

	***Game-based Learning:** an active learning technique where games are used to enhance student learning. ***Storybird:** an online social platform for storytelling. ***Note-taking Tools:** Applications or tools used for students to take notes or a way for teachers to display and present notes. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Uncertainty:** belief about tech is not definite ***Adapting:** adjusting to using technology ***Positive Change:** changing some aspects of teaching and instruction ***Efficiency:** Making tasks easier. ***Applicable:** picking and choosing which tools are applicable to content.		materials), Blackboard: students access their assignments, presentation tools: Prezi, Graphic tools: uses Canva for group project, game-based learning: Quizizz, Kahoot are used for assessment, it's fun and engaging, story board students create stories, note-taking tools, they take notes on Canva, technology provides hands-on, relies heavily on interaction, discussion, and collaborative work in the classroom, ETTP helped her to slowly accept technology and integrate it in her classroom, follows traditional model of teaching; realized she had to adjust and embrace change, try something new, help students stay and become engaged, adjusting her instruction, a student volunteered to help her set-up Google drive but she wasn't ready, student wanted to help	

			make things more efficient, she started using Google more especially with her lectures to keep the class flowing, her class is run in an organized fashion and later realized how tech makes things efficient, she's becoming more accepting, used google sheet for tabulation and realized how easy and efficient it was, incorporates game-based learning such as kahoot, quizizz, poll everywhere, was worried at first but realized students enjoyed it, grading is easier now, still learning to adjust because of her belief in "you have to work hard", really likes technology because it helped her become more efficient,	
RQ1 9. How confident were you in integrating technology before completing the program?	***Confidence (Before):** This describes the participants' confidence level before completing the ETTP. ***Evolution:** Technology is always evolving, advancing, and changing. ***Filtering:** selecting which tools to use and which are appropriate. ***Tool-Kit/Toolbox/Toolbelt:**	• Confidence (Before) • Evolution • Filtering • Tool-Kit/Toolbox/Toolbelt • Differentiating • Analogy • Curious • Needs not met • Competent • Not so confident	Moderately comfortable, Pretty Confident, Risk taker, Willing to learn, Not confident at all (no teaching experience), 3 out of 10 (confidence level scale),	**Various Levels of Competence and Confidence:** teachers differ in competence and confidence when integrating technology.

	Having a collection of various tools that can be used in various ways. ***Differentiating:** tailoring individual needs ***Analogy:** comparing two things, technology and real-life scenario, to explain and clarify. ***Curious:** regarding what tools are out there. ***Needs not Met:** the ETTP did not meet the needs of participants. ***Competent:** has necessary ability, knowledge, and skills using technology. ***Not So Confident:** not very confident before the ETTP. ***Training:** Received tech training prior to the ETTP. ***Student Portals:** Formerly Distance Education, an auxiliary online learning program that serves students, offering a range of core curricular and elective high school courses. ***Increased:** confidence level increased after the ETTP. ***Impactful:** ETTP having a major effect in teaching and lesson delivery. ***Fairly Confident:** to some degree; between not confident and extremely confident ***Lacking Resources:** does not have that many technological tools ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Challenge:** in terms of incorporating technology ***Time:** Insufficient amount of time to incorporate into the lesson/classroom. ***Very Confident:** very sure of her	• Training • Student Portals • Increased • Impactful • Fairly confident • Lacking Resources • Learned new technology tools • Challenge • Time • Very confident • Little assistance • Comfortable • Access to technology, • Fairly confident • Had prior experience • Application • Knows the basic	new technology being introduced; technology changes, deciding which technology will work and which will not; some fit "in between" so you just store it or file it away, you have different learners so you choose tools from your tool-kit to meet the learners, toolkit is separated into drawers (one drawer you use all the time, drawer two is for specialized tools, third drawer where you had a special situation), wants to know what tools are out there that may help solve a problem, learned tools and programs but does not meet his needs in terms of technology, he was able to get things done with technology before the ETTP, competent and confident using technology, Took training to be an online instructor; had prior experience with student portals; before	**Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	technological competence ***Little assistance:** may need some guidance, but once shown, they pick up quickly. ***Comfortable:** knows how to use the technology tools. ***Access to technology:** did not have access to technology in the classroom. ***Fairly Confident:** having a bit of confidence with technology ***Had Prior Experience:** had experience using technology before ETTP ***Application:** implementation and utilization of technology ***Knows the basic:** competent with basic technology skills and features ***Anxious and Scared:** experience worry or unease ***Competent to help students:** confident and knowledgeable enough to help students		ETTP, not so confident, ETTP played a major role in tech in her classroom, learned new tools from the ETTP, challenging to incorporate everything at once; it takes time to learn the skills; time to prepare and align it with lesson, very comfortable; 4.5 out 4, she can do almost everything regarding technology; may need some help here and there; but once she familiarizes herself with it; she picks it up easily and quickly, Fairly confident using technology; however didn't have a classroom set; she would have to share with others; she then got her classroom set of laptops and was fairly confident using them daily, fairly confident before entering the ETTP, experience with mainstream and common technology, the ETTP taught him tools he hasn't used before, used technology before the	

			ETTP, taught at an international school, used sites to upload assignments, she wasn't confident before ETTP, she was scared of using it the wrong way or lose lesson, she became comfortable afterwards and was able to assist students when they came across technological problem, 4 out 10,	
RQ1 10. How often did you use technology?	***Utilization of Tech (Frequency) Before:** This is how often they used technology before the ETTP. ***Technology is Embedded:** uses various of technology frequently and is embedded into lessons and content. ***Excited:** feeling about using technology in the classroom. ***Inexperience:** No prior teaching experience ***Frequent:** Uses technology frequently in the classroom. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Once a Week:** duration or amount of time teacher used	• Utilization of Tech (Frequency) Before • Technology is Embedded • Excited • Inexperience • Frequent • Learned New Technology Tools • Technology Integration • Once a Week • Daily • Not daily • Often • Interactive • Open to use technology • Twice a week	Five days a week, Every day, ready to use technology, loves technology, no experience integrating technology, no flow, twice a week, every day; all day, uses a lot of technology in the classroom; no difference in terms of frequency before and after ETTP, learned tools from ETTP, every day; technology tools used were not as sophisticated as now, uses technology every single day, not daily; would only use projector, before ETTP he integrated as much as he could, ELA is heavy on reading and writing; with	**Technology is used regularly in the classroom:** most teachers use technology in their classroom regularly. These technologies include hardware and software. **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	technology in the classroom. ***Daily:** used technology every day ***Not Daily:** not using technology every single day ***Often:** often used technology in the classroom ***Interactive:** hands-on; responsive **Open to use technology:** willing to use and try technology ***Twice a week:** use of tech in the classroom		technology it makes it more interactive, open to trying and using technology to enhance the content, uses technology every day, 40-55% of time technology is used within a given week,	
RQ1 11. Did you receive assistance from your school regarding integrating technology in the classroom? Did you receive any training relating to your area of teaching?	***Other Training/PD:** These are Training or Professional Development participants attended aside from the Educational Technology Training Program (ETTP). ***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom. ***School Assistance:** Receiving assistance from school relating to technology integration. ***Professional Development:** Specialized training relating to technology or technology integration. PDs can be offered by district (everyone invited) or school level. ***Pandemic:** because of COVID-19, the school district shifted to virtual then blended-learning. ***Blended Learning/Hybrid:** approach that combines both technology/virtual and traditional face-to-face teaching. ***District Support:** support offered by the school district. Different from school assistance.	• Other Training/PD • School-Provided Programs • School Assistance • Professional Development • Pandemic • District Support • Personal Spending • Hardware • Department Procurement • Technology Support • Introduced Vernier • Prioritized Content • Unfunctional • Self-Paid • No Support • Laptop • Lacking • Administrators • Library • Equipment • Community of educators • First-year teacher • Online Resources • Network with other teachers • Development of resources • Struggle • Achieve 3000 • Lack of assistance • Learned from others • Learned new technology tools • Professional learning community	Houghton Mifflin Harcourt (HMH; online access to textbooks as well as interactive workbooks), Achieve 3000, BlackBoard Ultra Training, Tough and challenging for everyone, District did a poor job preparing teachers for virtual learning, Poor planning, Stressful, Struggle building a community in the online platform, School tried their best, school was supportive (pre-pandemic), Good administrator (former), procuring grants for technology, bought iPad (personal spending), Provided MacBook Pro	Not enough assistance: Need for more training on content-specific technology integration: **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD** **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	***Pre-Pandemic:** before the Pandemic (COVID-19) and the shift towards virtual and blended learning. ***Personal Spending:** used personal money to subscribe or purchase technology or application. ***Hardware:** Physical and tangible technology. ***Department Procurement:** in charge of procuring resources such as technology for department. ***Technology Support:** school supports teachers by supplying them with technology (hardware, software, subscriptions, etc.). ***Introduced Vernier:** introduced vernier tools to the school. ***Prioritized Content:** Math and English Language Arts were prioritized. ***Unfunctional:** Technology didn't work well. ***Self-Paid:** Used personal funds to take courses or training relating to technology. ***No Support:** Did not receive any support from school/admin. ***Lacking:** Lacking classroom technology, specifically laptops. ***Administrators:** school leaders; requesting administrators for assistance ***Library:** at the time classrooms didn't have many devices; utilized tech resources at the library ***Equipment:** school provided the essential tools for the classroom. ***Community of Educators:** reaching out to other teachers for support and getting ideas.		(school assistance), Google Suite paid by district (district support), school was supportive (pre-pandemic), not supportive (pandemic), Videography training (PD), Gradebook (PD/other training), provided calculators and computers, procurement, requesting quotations and completing purchase order, provide them with technology, yearly training, at a halt at the moment, brought some vernier tools to the school and principal like it so they bought more, used computers in class but prioritized ELA and Math, Provided 10 computers for science, computers were not working well; outdated; old, bought more Vernier tools with his money, receive no support from district and school; admin does not provide necessary tools, provided	

	***First-year Teacher:** first year of being a classroom teacher. ***Online Resources:** search for ideas and resources online ***Network with other teachers:** getting ideas from other teachers ***Development of Resources:** created and developed resources; developed her curriculum through the use of technology ***Struggle:** experienced challenges developing resources for content area ***Achieve 3000:** online literacy curriculum (grades pre-K–12) that focuses on phonemic awareness, phonics and reading comprehension. ***Lack of Assistance:** no assistance provided ***Learned from others:** some programs were not taught by the school district, but were introduced by other teachers. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Professional Learning Community:** a method that fosters collaborative learning among colleagues within a particular work environment or field		classroom set (laptops), before the ETTP; classrooms didn't have that many laptops; after the ETTP; classrooms were supplied, requested for more laptops through administrators, 2016 iPad carts were issued; used more tech in the classroom; iPads were issued after ETTP; before ETTP it was limited, library had computers for student use; however, needed to schedule a time and date, school offered PDs and Training, provided equipment (technology) for the classroom; textbooks and resources, brought in representatives from different programs to show them how to use it; taught them how to integrate it into core materials, she did receive training; learned BB quickly because of training, teachers at her school are helpful and willing to teach and share ideas,	

			first-year of teaching; didn't get much assistance; didn't get materials from prior teacher who taught bio; previous teacher was more traditional in his teaching style, lacked resources; got ideas from online and other teachers, through technology she was able to develop her curriculum, she struggled creating and finding resources relevant to her content, she started in the in beginning of the school year; she felt forgotten, didn't know how to implement assessments such as ACT Aspire and Achieve 3000; first year, received training for achieve 3000; technology wasn't the focus; more of the program. Can't recall receiving assistance, no support: had to look for other ways, she learned about Clever from her husband who is a teacher, most of the programs she uses, she learned from the ETTP, she	

			is a member of the PLC for ELA, received training that were very brief,	
RQ1 12. How did your school offer support, such as professional development on effective ways to implement technology?	***School Assistance:** Receiving assistance from school relating to technology integration ***Online Assessments:** Assessing students understanding online; digital assessments; technology-based assessments. ***Professional Development:** Specialized training relating to technology or technology integration. PDs can be offered by district (everyone invited) or school level. ***Other Training/PD:** These are Training or Professional Development participants attended aside from the Educational Technology Training Program (ETTP). ***Ineffective PDs:** Provided PDs that were not effective. ***Grade Appropriate:** the quality of ability and work that is appropriate for students in a specified grade. ***No Support:** Did not receive any support from school/admin. ***Laptops:** procured laptops for classrooms. ***Social Studies Coordinator:** Manages the implementation of the Social Studies curriculum, content standards, and instructional practices throughout Public School System (PSS) schools. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***School-Wide Improvement Plan:**	• School Assistance • Online Assessments • Professional Development • Other Training/PD • Ineffective PDs • Grade Appropriate • No Support • Social Studies Coordinator • Community of Educators • School-wide Improvement Plan • School-provided programs • General Education • Content-specific • Blackboard • Achieve 3000 • Minimal support • Good experience • Unprepared • Learned new technology tools • Technology integration	Monthly school meetings, colleague support, Kahoot, Collaboration Supportive, Admin covers for teachers, provide professional development, Very supportive (school assistance), cover for you (school assistance), Offered PDs (PD), Department hosts PDs for Math, Achieve 3000, Renaissance, Follow-up PDs, Freckle, Multiple PDs relating to specific topics, Achieve 3000 is great for English Department, PDs claim to be appropriate for high school; in his experience they weren't, No support from administration, Training for achieve; renaissance; noredink, SS Coordinator gives them tips on tech tools; constructive feedback on the use of tech in the classroom, when	Schools brought representatives from different programs to offer training for teachers. Technology is not necessarily the focus but how to utilize the program in the classroom. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD** **Theme 4: Teachers Learn New Tools**

	each school is given funds to meet certain goals. ***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom ***General Education:** geared towards general use and not specific to any grade level or content ***Content-Specific:** technology tools or applications directly related to the teacher's content or subject. ***BlackBoard:** The endorsed Learning Management System that the school district is currently using for blended learning. This includes getting trained to set up virtual classes on BB. ***Achieve 3000:** online resource to promote literacy ***Minimal Support:** not so much support offered or given ***Good Experience:** had a great time and experience while a participant in the ETTP. ***Unprepared:** not ready to take on additional task ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. **Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments.		someone needs help; other teachers are willing to assist; or they would bring it up during staff meeting; host a mini PD or work session, not necessarily targeted directly towards technology; however, they were encouraged to use the SWIP funds to procure technology for their classrooms, provided PDs and training for Star and Achieve but the focus is not on the technology aspect, the district offers PDs and teachers are given the option to attend it or not, she completes PD for certification purposes, lack training/PD for specific for chem, PDs are usually geared towards general education, received training for BBU in preparation for remote learning, Receive training for Achieve 3000 through program representatives, they showed them	

			how to access different parts of the program, some teachers are willing to lend a hand; admin-wise not a lot of support, colleagues described the ETTP as a great but also sounded stressful, she wasn't ready to join so she postponed it twice, afraid of making mistakes, thankful that she learned new tools from ETTP, uses what she learned in her class (integration)	
RQ2 13. How confident were you in integrating technology after completing the program?	***Confidence After:** This describes the participants' confidence level after completing the ETTP. ***Instructional Strategies:** techniques used in the classroom to enhance learning. ***Challenges:** Difficulties, troubles, or encounters during the ETTP. ***Increased:** confidence level increased after the ETTP. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Eye-opening experience:** unexpectedly enlightening ***A little:** confidence level regarding technology integration increased by a small increment. ***Confidence increased:** there was an increase in confidence integrating technology	• Confidence After • Instructional Strategies • Challenges • Increased • Learned New Technology Tools • Eye-opening experience • A little • Confidence increased • Continued application • Self-taught • Resourceful • More confident	Same level, not sure if it changed, risk-taker, willing to learn new things, network, community, created a community, network, a little more, 7.5 out of 10 (from 3 out of 10), aligning technology with content, cohesion and flow, tried to utilize mail merge to create certificate for a swim team but experienced the same problem during ETTP, No change in confidence after the ETTP, it was more of a refresher, the ETTP helped	Participants felt more comfortable integrating technology after the ETTP. **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	***Continued Application:** continued the use and implementation of technology ***Self-Taught:** acquired new skills or knowledge through one's self and initiative or either through tutorials such as videos. ***Resourceful:** to be inventing in finding other technology tools ***More confident:** confident level increased		a little; picked up some useful thing; intensive courses; a little bit more confident, was already competent; after she felt a bit more confident, confident increased a little; not only for student use but more confident in terms of personal use; using more of google suites; feels more comfortable using it to structure her classroom, making it more efficient for her, was fairly confident before the ETTP, confidence increased a little bit because he learned new tools and resources to integrate, not every tool is applicable or specific to ELA, it depends on the lesson and outcome you expect, confidence got better, not super confident but known he has additional tools to use at his disposal should it become applicable, there was no change in terms of frequency, she continued to	

			use technology, feels the same as well, taught herself how to use different programs especially those she uses often, learned to use adobe however license was never provided, had to find other means or programs that are similar in order to continue using tool, more confident and comfortable using technology, increased to 7 out of 10	
RQ2 14. How often did you use technology?	***Utilization of Tech (Frequency) After:** This is how often they used technology after the ETTP. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***Common Applications:** apps and tools introduced by ETTP were already being used by teachers. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Self-Taught:** acquired new skills or knowledge through one's self and initiative or either through tutorials such as videos. ***Instructors:** Sharing about the instructors of the courses. ***Every day:** the amount of time teacher used technology after ETTP. ***Classroom Set:** having a set of laptops for each student in the classroom	• Utilization of Tech (Frequency) After • Community of Educators • Common Applications • Learned New Technology Tools • Self-taught • Instructors • Every day • Classroom Set • Can't remember • Technology is Embedded • More frequent than before • Refresher • Applicable • Daily	Daily, every day, more aware of other tools, self-taught, stay abreast, effective, community of teachers, Three to four times a week, same; used it daily; every day, taught how to incorporate Quizizz and Kahoot; but these have been used in classrooms; not new information, Adobe Acrobat was helpful, learned tips from other teachers, watched videos and learned, instructors were there to help; but did not provide in-depth training,	**Theme 4: Teachers Learn New Tools**

	***Can't Remember:** can't recall everything they learned from the ETTP. ***Technology is Embedded:** uses various of technology frequently and is embedded into lessons and content. ***More frequent than before:** uses technology more after the ETTP ***Refresher:** courses were a review of prior experience ***Applicable:** picking and choosing which tools are applicable to content. ***Daily:** used technology every day		instructors were there to facilitate the class and learning, school provided each class a set of laptops for student use; tech was used more frequent because of access, can't remember everything; however, did incorporate some of the things taught; tried to integrate afterwards, technology became a part of his teaching; picked up some things that are important and integrated them, still uses it every single day, uses technology every day even after the ETTP; used BB every day in the classroom; virtual classrooms for half of the school year, he learned new tools that he hasn't used before, integrated more after learning new tools; google sites, storyboard, tricks in google doc, integrated more of what he learned, didn't use everything, picked which were	

			applicable, continued to use it every day, big increase in frequency, mostly embedded within her BBU course or used Canva, 80% of the time technology is used in the classroom, increased to 50-75% of the time technology is used within a week	
RQ2 15. What are some types of technology you use in your classroom?	***Online Assessments:** Assessing students understanding online; digital assessments; technology-based assessments. ***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom ***Hardware:** Physical and tangible technology. ***Outdated:** technology that are old or obsolete. ***Efficiency:** Making tasks easier. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Google Apps:** Applications created by Google such as Google docs, sheet, forms, slides, Gmail, etc. **Presentation Programs:** software that is used to create presentation slides. ***TOW:** Technology on Wheels. Laptops that are stored in carts with wheels. ***PhET:** Interactive simulations from the	• Online Assessments • School-Provided Programs • Hardware • Outdated • Efficiency • Technology Integration • Google Apps • Presentation Programs • TOW • PhET • Modern versions • Science tools • Web-based tools • Augmented Reality • Technology on wheels • Online classroom • Communication tools	BlackBoard, Elmo, document camera, projectors, TV, WhatsApp, computers, hardware, software, laptops, Technology on Wheels (TOWs), iPads, PowerPoint, Google Slides, Notes for students, uses it daily, desktops, PhET interactive simulations, triple balance beam, Vernier caliper, digital scales, introduce new ways and old ways (technology), had some cardboard VR sets; need to use cellphone; download some apps, laptops; Chromebook, Google Apps was the most common tool he used in	Various types of technology are well-integrated in the classroom **Theme 2: Ongoing Technology Training/PD** **Theme 4: Teachers Learn New Tools**

	University of Colorado, Boulder. ***Modern Versions:** modern versions of older science tools (ex. Triple balance beam vs. digital). ***Science Tools:** a variety of scientific tools (scales, probes, etc.) **Web-based Tools:** software, applications, websites that runs on web browsers and require internet connection. ***Augmented Reality:** adds digital elements to a live view often by using the camera on a smartphone. ***Technology on Wheels:** classroom set of laptops in carts ***Online classroom:** online system that allows students and teachers to collaborate and communicate ***Communication Tools:** app that allows remote communication.		class, everyone in the school district was using BBU, integrated game-based learning to enhance content, used projector as display, integrates software in online class, especially AP Chem, uses WhatsApp to communicate with students, Khan Academy for practice, uses document camera, printer, smart board, iPad to illustrate concepts, Chromebook, she has laptops, the school issued students laptops for virtual and blended learning, students use their cellphone, she uses the projector,	
RQ2 16. What are some technology tools you use in your classroom (ex. Google Docs, google form, kahoot, etc.)? What are some technology tools you use that are related to your content area?	***Integration:** integrating with other content. ***Online Assessments:** Assessing students understanding online; digital assessments; technology-based assessments. ***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom ***Virtual Class:** Online teaching and learning; the shift from traditional to virtual because of COVID ***Content-Specific:** technology tools or	• Integration • Online Assessments • School-Provided Programs • Technology Integration • Utilization of Tech (Frequency) Before • Utilization of Tech (Frequency) After • Virtual Class • Content-Specific • Recommendation • Web-based tools • Student Data • Graphic Design Platforms • STAR Math • Vernier • Spreadsheets	Achieve 3000, IXL, HMH, Interactive Reader, Desmos, Accelerated Math, Renaissance, Freckle, Pearson, Khan Academy, Google Apps, Google Doc, Google Sheets, EBSCO, Google Scholar, Plagiarism checker, Calculators, Desmos Graphing	Various types of technological tools are well-integrated and used in the classroom to enhance content. There is a need for content specific tools especially for science teachers. **Theme 1: Content Specific Technology Training**

	applications directly related to the teacher's content or subject. ***Recommendations:** tech tools or apps that should be provided by either the school or district. **Web-based Tools:** software, applications, websites that runs on web browsers and require internet connection. ***Student Data:** pieces of information; monitoring student progress ***Graphic Design Platforms:** online tools that students can use to create graphics such as posters, infographics, flyers, etc. ***STAR Math**: a student-based, computer-adaptive assessment for measuring student achievement in. math. ***Vernier:** Software and Technology that supports teacher sciences. ***Spreadsheet:** electronic document where data or information are arranged in columns and rows that can be manipulated and perform other calculations. **Presentation Programs:** software that is used to create presentation slides. **Portable Document Format (PDF) Software:** the format is used when you need to save files that cannot be modified but still need to be easily shared and printed. ***Frequent:** Uses technology frequently in the classroom. ***Subscriptions:** required fees ***Houghton Mifflin Harcourt (HMH):** online access to textbooks as well as	• Presentation Programs • PDF Software • Frequent • Subscriptions • HMH • Comic Maker Online • Gilder Lehrman • Grammarly • Cell phone • Mentimeter • Renaissance • Quizlet • Microsoft Office • Animation software • PhET • Padlet • Science 360 • Better Lesson • Storybird • Google apps • Game-based learning •	Calculators (Online calculator), Freckle (math program; collects data on student progress on certain math topics), Canva, Poster My Wall, monitor student progress, YouTube, Pearson, Logger Pro (vernier software), Spreadsheet for data collection, convert documents to PDF; less printing, uses game-based learning frequent; Kahoot and Quizizz, some tools were introduced but in order to continue using it, it required fees/payments , access to online textbook; my.hrw.com online version, Toondoo (obsolete?); comics make believe, primary resources on American history, clips from YouTube, Ed Puzzle, Zoom, HMH, Grammarly; encourages students to use this tool for proofreading and checking for grammar; not mandated, preferences; some students	**Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	interactive workbooks), ***Comic Maker Online:** web-based tools to create visuals for storytelling. ***Gilder Lehrman:** provides teachers, students, and the general public with direct access to unique primary source materials on American history through educational programs and resources. ***Grammarly:** cloud-based writing assistant that reviews spelling, grammar, punctuation, clarity, engagement and delivery mistakes. ***Cell Phone:** hand held device/computer; mobile device ***Game-based Learning:** an active learning technique where games ***Mentimeter:** free live pool for engaging audience ***Renaissance:** tech-based for accelerated learning in math and reading ***Quizlet**: a web-based application developed to help students study information ***Microsoft Office:** software developed by Microsoft which includes Microsoft Word, PowerPoint, Outlook, Excel, Publisher, etc. ***Animation Software:** software that allows for the creation of videos ***PhET:** Interactive simulations from the University of Colorado, Boulder ***Padlet:** virtual bulletin board ***Science 360:** app that provides the latest science videos ***Better Lesson:** website that provides lesson plans created by teachers worldwide		prefer to use their cell phone; others use a laptop others use both; nothing is mandated, integrated game-based learning such as Quizizz which he knew before the ETTP, uses mentimeter to engage students through discussions, Google apps are well integrated in his class, Quizlet; not a fan of online assessment, limits diversifying assessment, graphic designs: see-saw, videos, collage, Glogster, Easel.ly, MS Office: PowerPoint, Animation software: animoto, pixelate, Go animate, science 360: not many videos pertaining to chemistry, more of technology and engineering, Better Lesson: goes to this site for lesson plan and ideas, students create their books; they can share their stories, students share work using Google Apps, it's collaborative,	

	***Storybird:** an online social platform for storytelling. ***Google Apps:** Applications created by Google such as Google docs, sheet, forms, slides, Gmail, etc. ***Game-based Learning:** an active learning technique where games are used to enhance student learning.		Uses Quizizz, Kahoot, poll everywhere, bingo generator, Canva, HMH, readwritethink .org, Prestwick house, citation machine, encyclopedia Britannica online, Purdue owl, united states holocaust memorial museum , readworks.org , literarydevices .net, reading and writing haven, teacher thrives, teach for heart (websites),	
RQ1 17. Please describe your experience when you were completing the technology training for teachers. (Example: you can share your experience about the core courses, the instructors, the technology tools the program introduced, etc.)	***Assignments:** Sharing about the course load/assignments ***Usability:** User's experience; ease of use. ***Frustrated:** Dissatisfactions about the program ***No effort:** Did not put effort into the course. ***Course development:** How the courses were set-up and built. ***Instructors:** Sharing about the instructors of the courses ***Personalize:** The courses were not personalized; instructors were just inherited the course and continued to use it rather than building on it and improving it. ***Redundant:** teaching the same or similar apps or tools. ***Virus:** getting virus from software or programs provided by the ETTP. ***Choices:** Offer different tools and have them select which	• Usability • Assignments • Frustrated • No effort • Course development • Instructors • Personalize • Redundant • Virus, Choices • Online Assessments • Exposure • Satisfaction • Technology is Embedded • Community of Educators • Google Certified Educators • Elementary Level • District Level • Flashy • Unfitting • Good experience • Learned New Technology Tools • Stressful • Manageable • Positive Learning Experience • Advanced Computer Applications • Relevant • Useful	Inefficient (the inefficiency of the program), Completed All Assignments, Frustrated, No Effort, Course set-up/development, Instructors were good, need to personalize courses, Redundant, Got a virus, good program, instructors were knowledgeable, program set-up, face-to-face, treated professionally , Network and support, Some programs are obsolete, Positive experience, support system, First cohort (guinea pigs), introduced	Some parts of the program were inefficient. The instructors were knowledgeable, competent, caring, and supportive. The program promoted collaboration and network of teachers. The program introduced new tools to implement in the classroom. **Theme 4: Teachers Learn New Tools**

	would work best for them. ***Online Assessments:** Assessing students understanding online; digital assessments; technology-based assessments. ***Exposure:** exposure to different technology tools. ***Satisfaction:** Satisfied with the program; met the expectations of the participant. ***Technology is Embedded:** uses various of technology frequently and is embedded into lessons and content. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***Google Educators:** allows teachers to understand the many tech tools and apps offered through Google for use in the classroom. Must pass Level 1 and 2 Exam. ***Elementary Level:** set-up or catering towards the elementary level. ***District Levels:** District is separated into Elementary, Middle, and High School. ***Flashy:** to attract ***Unfitting:** Does not fit or pertain to a high school ***Good Experience:** had a great time and experience while a participant in the ETTP. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Stressful:** causing mental or emotional stress; demanding; feeling worried or anxious. ***Manageable:** able to complete or	• Intensive • Dragging • Technology Integration • Easy • Enjoyed • Face-to-face • Independent learning • Refresher • Recommends • Straightforward • Useful and pragmatic • Engaging • Practice • Cohorts • Instructors • Time • Value technology because of COVID • Content-specific • Enjoyed • Heavy workload • Excited to learn and integrate • Certain assignments were uncomfortable • Fell behind • Pushed through • Felt like giving up • Personal beliefs • Adapting • Assignments • Course development	Google apps, Adobe, Quizlet, Diigo, Close knit community, comradeship, working together to pass the course, Instructors, tools, were good; instructors were caring, felt that the program was more for elementary teachers, Felt that the district is more an elementary level, felt that the program was geared towards elementary teachers to prepare flashy "stuff" for students, not useful for high school, taught them instructional strategies while using technology; CITW classroom instructions that work, Learned new tech tools but cannot recall everything; Google apps, stressful because on top of ETTP she had her job as a teacher, family, etc.; a lot of assignments; but manageable, equip her with tools and skills relating to educational technology,	

	accomplish without difficulty. ***Positive Learning Experience:** the ETTP was a great experience and provided tools and skills relating to technology. ***Advanced Computer Applications:** A course that dives into different operating system. ***Relevant:** integrating technology to lesson; cohesive; flow. ***Useful:** is purposeful and practical. ***Intensive:** very thorough (program). ***Dragging:** felt like the program went on for a long time **Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Easy:** describing the level of difficulty about some of the workload during the ETTP. ***Enjoyed:** to take delight or pleasure in the ETTP. ***Face-to-face:** once a week, participants and instructors meet and interact at the same location. ***Independent learning:** participants had to take ownership of their learning ***Refresher:** the courses were a review of prior experience with technology ***Recommends:** promotes and endorses the ETTP ***Straightforward:** course content was direct and simple ***Useful and Pragmatic:** tools introduced are useful and relevant ***Engaging:** the course and instructors engaged the participants		Advanced computer applications taught her things about computers, overall had a positive experience, instructors were accommodating, the program was relevant to her job as a teacher, very thorough; but useful, instructors were quite good, integrated what was taught, some of the work were beginner level, participants all had different skillsets regarding technology, some teachers were struggling, struggled using Mac, learned different tools, enjoyed her time in the ETTP; liked the instructors, face-to-face was cut short because of the pandemic, because it was sudden; they didn't meet virtually as well, independent learning; didn't have a problem with that; exposed to technology her whole life, the course load wasn't bad; most of it the assignments	

	***Practice:** applying the tools introduced ***Cohort:** group of teachers; usually grouped based on school ***Time:** program should be longer rather than five weeks ***Value technology because of COVID:** never realized the value of technology in the classroom until COVID happened and the stich to remote learning ***Pandemic:** because of COVID-19, the school district shifted to virtual then blended-learning. ***Content-specific Apps:** application relevant to content or domain. ***Enjoyed:** to take delight or pleasure in the ETTP. ***Heavy Workload:** a lot of assignments on top of being a teacher ***Excited to Learn and Integrate:** eager and enthusiastic to learn new content and incorporate it into the classroom ***Certain Assignments were uncomfortable:** felt scared towards some assignments; uncomfortable ***Fell behind:** struggle to keep up with assignments ***Pushed through:** to persist and keep moving forward regardless ***Felt like giving up:** exhausted and wanted to quit ***Personal Beliefs:** ideas, thoughts that a person holds as being true ***Adapting:** adjusting to using technology ***Assignments:** Sharing about the course load/assignments ***Course development:** How the		were more of a refresher, learned new materials; tools from the ETTP, recommends other teachers to take the program if they haven't, tools are practical, teaches strategies for students to use tech ethically and responsibly, instructors were knowledgeable and clear with their expectations, did a good job teaching, during face-to-face instructors provided activities to keep them engaged, they set their expectations, the work was manageable, they were given time to practice and play around with the tools before completing tasks, they got better by practicing, some tools were challenging especially those that they were not familiar with like narrating google maps, overall a good experience, private schools were concentrated together; didn't get the chance to meet teachers	

	courses were set-up and built.		from public school, teachers provided hands-on activities, they were very helpful, gave them time to reflect on the applicability, five week course is not enough to retain everything, managing time as a teacher and completing ettp was challenging, relies heavily on technology now, but pre-pandemic she took technology for granted, wants more science related tools to integrate, balancing work and family while completing ETTP assignments, excited to integrate things she learned from digital citizenship course such as creating contracts, implementing game-based learning and graphic tools, she felt uncomfortable creating videos and narrative, recording herself, she had a great time with ETTP, at first she felt overwhelmed because she wasn't used to the multiple	

			instructor set-up, it made her anxious, the instructors were knowledgeable and competent, they gave them chances, she struggled to manage course load, she was overwhelmed by blended learning and teaching, she felt exhausted, became extra behind in April 2021, she had to push through little by little, she wanted to drop out of the program, but the instructors were encouraging and gracious, they allowed them to turn in assignments even if it was late, she knows she won't master everything but can take as much as she can to implement in the class and to grow professionally and personally, the instructors were very responsive and helpful, her colleagues were also helpful, some assignments that were manageable and times when she felt it was too much, the amount was	

			too much but the difficulty of the assignment was manageable, over time she learned to adjust and accept, she learned to pace herself, because of COVID they had to move to virtual; she wanted blended learning but the majority voted for online, with blended she felt like some things can only take place in an in-person setting, you can get immediate feedback,	
RQ1 18. Describe your beliefs, attitudes, and perception about technology integration in the classrooms before completing the professional development.	***Before ETTP:** Acceptance and knowledge (belief) about technology integration before completing the ETTP. ***Laptop Initiative:** incentive for completing the program. Participants are given a free MacBook Air to keep. ***Technology is a Tool:** Teachers must not rely on the tools for teaching students because it is not the tools, itself, that help students learn. It is the way in which the tool is used. ***Building a community:** having students actively engaged and learning from one another. ***Critical Thinkers:** evaluating a situation and problem-solving. ***Affirmation:** Confirming belief or ideas about technology.	• Before ETTP • Laptop initiative • Technology is a tool • Building a community • Critical Thinkers • Affirmation • Disagreement, Disengagement • Teachers are valuable • Inexperience • Without Intention • Comfortable • Dislike • Rediker • Technology is an important tool • Trends • No change • Supports Learning • 21st century skills • Valuable • Satisfaction with classroom tech • Growth • Evolution • Supports • Efficient • Technology Integration • Open	Integrated technology, no change after the ETTP, not a miracle worker, does not replace the teacher, live person (technology can't replace that interaction), students helping each other, technology cannot answer everything, shared beliefs (with instructor), doesn't make you God in the classroom, tech is a tool; need to know how to use them; does not like all of them, rediker; worst school management system he's	Technology is a tool. Technology is an integral tool in the classroom. Technology promotes student engagement. Technology enhances the lesson. Technology promotes 21st century skills in the classroom. Teachers need to stay abreast because technology is ever-evolving. **Theme 4: Teachers Learn New Tools**

	***Instructors:** Sharing about the instructors of the courses ***Disagreement:** disagreement in how to use technology in the classroom. ***Disengagement:** disengaging students by not using technology effectively or appropriately. ***Teachers are Valuable:** they are an important part of the classroom regardless of technology advancement. ***Inexperience:** No prior teaching experience. ***Without Intention:** No purpose or objective to use technology; without proper planning; just wanted to use technology. ***Comfortable:** knows how to use the technology tools. ***Dislike:** does not like some tools ***Rediker:** Integrated school management system, data management, school-to-home, communication, grading system. Software that the district is currently using. ***Technology is an important tool:** important device that in the classroom. ***Trends:** a general direction in which technology is changing and developing. ***No change:** beliefs did not change after ***Supports Learning:** The use of technology in the classroom helps students with their learning. ***21st century Skills:** skills and competence that are important for students to be successful in both the workforce and college. ***Valuable:** technology is extremely important	• Learned new tools • Technology is a must • Accommodation • Confused with the meaning of "technology integration" • Technology integration • Adapting • Uncertainty • Mixed thoughts • Evolution • Digital citizenship	experienced, technology is changing rapidly; need to stay abreast; be on the lookout for new technology to implement and integrate, beliefs remained the same throughout the program, technology is important as it supports learning, technology helps students acquire 21st century skills, it's been known for a long time that technology is important; valuable, looking to learn as much as he can, didn't have all the tools to incorporate, satisfied with the classroom tech provided, there's always room to grow and improve technology us in the classroom, technology is always changing; new things coming out, 100% support technology, if teachers are skilled with technology it makes things easier and more efficient; we are moving into a more technological society, integrating technology is beneficial for	

	***Satisfaction with classroom tech:** satisfied with the technology in the classroom. ***Growth:** there's always room to grow and improve **Evolution:** Technology is always evolving, advancing, and changing ***Supports:** in favor of technology ***Efficient:** the use of technology in the class can make tasks easier, it can be efficient, and assistive. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Open:** exposed to technology and recommends it. ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Technology is a must:** it has to be implemented and used in the classroom ***Accommodation:** Accommodated every student relating to technology; ensures everyone has access to do projects and assignments; the use of technology is not mandatory at home. ***Confused with the meaning of "technology integration":** wasn't sure what the word "technology integration" meant ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Adapting:** adjusting to using technology ***Uncertainty:** belief about tech is not definite		students; they are part of this society; students are technologicall y advanced; digital natives, open to the use of technology; she saw how efficient it can be and how comfortable students are using technology in the classroom as oppose to traditional methods like writing, at that point she knew to integrate it, ETTP provided more tools and strategies to integrate technology and not just using the tool, was already comfortable with technology in her class, always believed in the importance of technology, it is an integral part of the classroom, helps hone 21st century skills, an important part of student experience, one of the reasons why he joined the ETTP to learn more tech tools, she believes that technology is a must in the classroom, she uses technology to accommodate students who are traveling	

	***Mixed Thoughts:** mixed feeling; having multiple and often competing emotions about a situation ***Evolution:** Technology is always evolving, advancing, and changing, ***Digital Citizenship:** A course offered that is design to teach students to use technology responsibly.		and technology is the best way to accommodate those students, she thought that technology integration meant only to implement an use the technology that was mandated by the district, using computers, accessing the internet, but later got clarification of what technology integration meant through ETTP, integrating other software and tools as well, continue using and exposing students to technology, learning is changing, shifting towards 21st century tools and apps, she wasn't as receptive to the use of technology, wasn't sure how tech could be beneficial in her class, thought that technology would depreciate learning rather than enhance, she still has mixed thoughts today but also learned to appreciate the value of technology, tech is always	

			evolving, there's always going to be the good, the bad, and the ugly of technology; what matters is how you handle and implement technology, you cannot control how other people use it, teach students to navigate the online terrain in a healthy manner and responsibly,	
RQ2 19. Describe your beliefs, attitudes, and perception about technology integration in the classroom after completing the professional development. How has this professional development influenced your beliefs, attitudes, and perception about technology integration within your course content?	***After ETTP:** Acceptance and knowledge (belief) about technology integration after completing the ETTP. ***Affirmation:** Confirming belief or ideas about technology. ***Efficient:** the use of technology in the class can make tasks easier, it can be efficient, and assistive. ***Limitation:** technology has limits, it cannot perform or do everything in the classroom. ***Critical Thinkers:** evaluating a situation and problem-solving. ***Relevant:** integrating technology to lesson; cohesive; flow. ***Useful:** is purposeful and practical. ***Tool-Kit/Toolbox/Toolbelt:** Having a collection of various tools that can be used in various ways. ***Insufficient Technology:** in terms of supporting learning. ***Memorizing and Gaming:** tools that are in the forms of games and support memorization. ***Quizlet**: a web-based application	• After ETTP • Affirmation • Efficient • Limitations • Critical Thinkers • Relevant • Useful • Tool-kit/toolbox/toolbelt • Insufficient technology • Memorizing and gaming • Quizlet • Higher Order Thinking Skills (HOTS) • Refresher • No change • Equip • 21st century Skills • Technology Integration • Student Engagement • Usability • Valuable • Awareness • Stay Abreast • Supports • Beneficial • Overwhelming • Content-specific apps • Nearpod • Math and English Language Arts • Research • Unaware • Learned new tools • Enhance content	No change after the ETTP, limitless assistance using technology, teachers' primary job is to promote thinking, some limitations and limits by the creator and the coders, technology can be helpful, if there's not technology then students need to learn to be resourceful, purposeful selection of technology, variety of technology tools, forcing technology into lessons, perspective change, lesson drives technology and not vice versa, technology today support a lot of memorization	The ETTP affirmed teachers' beliefs regarding technology. Teachers are more aware of the different tools out there. The ETTP exposed teachers to different technological tools. **Theme 1: Content Specific Technology Training** **Theme 4: Teachers Learn New Tools**

	developed to help students study information through interactive tools and games. ***Higher Order Thinking Skills (HOTS):** is thinking on a level that is higher than memorizing facts or telling something back to someone exactly the way it was told to you ***Refresher:** the courses were a review of prior experience with technology ***No change:** beliefs did not change after ***Equip:** ETTP providing knowledge and strategies to implement in the classroom regarding the use of technology. ***21st century Skills:** skills and competence that are important for students to be successful in both the workforce and college. **Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Usability:** User's experience; ease of use. ***Valuable:** technology is extremely important ***Awareness:** bring awareness or make aware of the different tools out there that can be used in the classroom. ***Stay Abreast:** to stay up-to-date with technology* ***Supports:** in favor of technology ***Beneficial:** technology is helpful for students. ***Overwhelming:** it can be stressful	• Differentiation and creativity • Remained the same • Proficiency • General tools • Student engagement • 21st century	rather than learning and understanding (higher order thinking skills), Quizlet supports memorization; students who can regurgitate facts and memorize facts, many tools reward students for memorizing rather than deeper, meaningful understanding of concepts and ideas, reminded teacher about what things to focus on and strategies using technology to address that, already knew the importance of technology, happy because ETTP equipped her with knowledge to use and share in her classroom, preparing kids to be successful in college and workforce, motivates her to use more technology in the classroom; influences how she assess her students; example are student projects; uses technology a lot, students are more engaged, students have it at their fingertip; it's	

	integrating especially if it's mandated ***Awareness:** bring awareness or make aware of the different tools out there that can be used in the classroom. ***Content-specific Apps:** application relevant to content or domain. ***Nearpod:** a website and app-based digital tool that lets teachers create slide-based learning resources that are interactive for students to engage with and learn from. ***Math and English Language Arts:** these content areas are always the main focus. They are provided with content-specific applications and tools. ***Research:** a teaching strategy to find information about a given topic. ***Unaware:** uninformed about content-specific apps or tools that are out there ***Learned New Technology Tools:** was introduced to new tech tools and integrated into class. ***Enhance content:** the use of technology helps improve and reinforce the content ***Differentiation and Creativity:** the use of technology allows students to showcase their understanding of the lesson rather than the traditional approach ***Remained the same:** belief did not change after the ETTP ***Proficiency:** having competent using technology. ***General tools:** tools introduced are geared towards general education ***Student Engagement:** Engaging student;		easier to use; it's free, beliefs didn't necessarily change as he already knew the value of technology in the classroom; it made him more aware of what is out there; other options to add to his toolbox; it broadened his perspective; made him open-minded to try new things, teachers should stay abreast; become more tech savvy, views did not change; still in support of technology; more technology in the classroom, it helps students, overwhelmed; especially when it's mandated; teachers get used to it; then something new comes up and is expected to learn the new tool; there's so many tools out there; it gets overwhelming to choose what to use, is more aware of the different tools out there; exposed to different to tech tools; thankful, wishes there were more content-specific apps,	

	getting their attention; learning; curiosity. ***21st century Skills:** skills and competence that are important for students to be successful in both the workforce and college. ***Perception of Technology:** impression and understanding of technology in the classroom ***Enhance Lesson:** improve lesson through the use of technology ***Realization:** recognizes and is aware of how technology can be used ***Adapting:** adjusting to using technology		Nearpod has pre-made content but doesn't cover everything, Math; IXL; ELA; Achieve 3000;Quill; content-specific, for science there's no specific apps; constantly searching for apps, for science she has to be creative; she has students do research on specific topics; work on case studies; no specific apps, she knows that there are specific tools out there for her content but she is unaware, district pushes for more focus on ELA and Math, feels left out; wants specific app for skill practice, she is for technology integration; but when it comes to science; there's not enough tech tools, there are general tools but would like something specific or a tool catering to biology, she saw how her instructors were using technology and integrating it into the lesson, so she modeled after	

			them; they had a positive effect on her teaching, various ways to show understanding, students used different tools to display their creativity and understanding of the lesson, the ETTP solidified his beliefs about technology, to continue to stay abreast, to enhance content, ETTP instilled the importance of technology, realized the values of ETTP especially during the shift to remote learning and teaching distance education. Still believes that technology is an integral component in the classroom, continued to use technology after ETTP, however trying to find alignment between technology and curriculum/student goals, enjoys using technology, student still haven't mastered basic computer skills; pushing for computer class to teach students basic tech skills, tech is	

			relevant to students and relevant to teachers, wants more content specific tools; need more lab experiences, she needs to use technology to teach and students should learn how to use technology, technology is an advantage for student learning, tech can accommodate shy kids, through tech students create unbelievable products, students love using different artistic tools, promotes 21st century skills, tech is helpful, can continue to use it as they further their education, not fully for it but appreciate it's value; can use it to enhance instruction and also student learning, use it to enhance and improve student learning, technology cannot replace personal interaction but tech can supplement it, would still use technology in the class but not to the point where she loses personal connection,	

			she is now more receptive and is aware of the good and the bad of technology, still haven't mastered everything and is still learning, learning is a continual process, she still has a lot to learn regarding how to use technology responsibly and effectively, not to just use it with caution but use it with a positive mindset, manage how to use it properly, use it to enhance the lesson and not take away from the lesson,	
RQ2 20. Explain any barriers that may have prevented you from effectively integrating technology in the classroom. What types of barriers or challenges did you encounter while integrating technology within your course content?	***Course development:** How the courses were set-up and built. ***Usability:** User's experience; ease of use. ***Instructors:** Sharing about the instructors of the courses ***Assignments:** Sharing about the course load/assignments ***Coders:** the ideas and the creation of the coders ***Connectivity:** connection to the internet. ***Equity:** disparity between those with technology and those without. ***Access:** those who have access to technology vs. those without. ***Money:** having funds to procure technology	• Course development • Usability • Instructors • Assignments • Coders • Connectivity • Equity • Access • Money • Supplemental Materials • Time • Socio-Economic • Accommodation • Support • Principal • Excluding Students • Hostile Environment, • ack of Understanding • Safety • Alignment and Relevance • Strategies for engagement	Better course development, usability, inefficient, time, some tools aren't relevant to content, wait for coders to envision things, internet is slow on island, slower when shifted to virtual and the use of BlackBoard (web-based), school issued laptops for everyone, high number of students enrolled in distance education, sometimes schools don't provide you	The main barriers are time, access, connectivity, infrastructure, and proficiency. **Theme 1: Content Specific Technology Training**

	for teachers or classroom. ***Supplemental Materials:** extra accessories that should come with the technology such as batteries, warranties, subscriptions, etc. ***Time:** Insufficient amount of time to incorporate into the lesson/classroom. ***Socio-economic:** students coming from different income brackets; students coming from lower income do not have access to technology at home as well as internet connection. ***Accommodation:** Accommodated every student relating to technology; ensures everyone has access to do projects and assignments; the use of technology is not mandatory at home. ***Support:** Support from district leaders and administrators. ***Principal:** Head of the school. ***Excluding Students:** Does not think or consider the effects of students. ***Hostile Environment:** behavior within a workplace creates an environment that is difficult or uncomfortable for another person to work in. ***Lack of Understanding:** lack of understanding about science as a content. ***Safety:** ensuring student safety; locks chemicals away ***Alignment and Relevance:** aligning technology with English Language Arts content standards. ***Strategies for Engagement:** approach to making technology more	• Technology integration • Proficiency • Library • Student Skills • Completing Assignments • Procrastination • Equipment • Not Content-specific • More tech training • Disseminating information • Restrictions • Power Outage • Content-specific apps • Availability • Challenge integrating • Procurement • Proficiency • Students with special needs • Connectivity • Availability • Technological issues • Interruption • Student absenteeism • Distraction	with technology, Batteries for TI calculators were not considered technology, Received SMART Board but needed subscription to fully operate, time to complete projects/assignments with tech, Does not receive support from principal; nepotism, no support from students; affects students, does not get supplies; not given opportunities, unprofessional, lack of understanding; science is hands-on; to learn science, you have to do science; admin does not support him, gets harassed for safety issues; but ensures students cannot access lab materials including chemicals, making it engaging for all students; not all are responsive to the use of technology; not excited to use it even with access, did not experience barriers regarding technology integration, other teachers	

	engaging in the classroom. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Proficiency:** having competent using technology. ***Library:** using it as a means of resource rather than just using the internet ***Student Skills:** a diverse skill in computer or technology use among students. ***Completing Assignments:** students completing the assignment using technology. ***Procrastination:** not using time wisely to complete assignments. ***Equipment:** school provided the essential tools for the classroom. ***Not Content-Specific:** Not relating to content or domain. ***More Tech Training:** lacking training in regards to technology ***Dissemination of Information:** relaying information to everyone in the district ***Restrictions:** the district has put restrictions to certain websites. ***Power Outage:** no electricity causing disruption with technology use and WiFi. ***Content-specific Apps:** application relevant to content or domain. ***Availability:** having enough available devices in the classroom. ***Challenge integrating:** does not want to lose content by incorporating too much technology		need to be proficient using technology in the classroom, students forget that there's a library; traditional way of finding answers; research, some students are more advanced than others; some don't have basic tech competence; still don't know how to access email; work with students one-to-one, teacher gives enough time to complete assignment on No Red Ink; students still don't complete them; common among other teachers, classrooms are adequately funded in terms of technology, lack of content-specific technology PDs for SS; doesn't recall much PD relating to SS; district should improve in this area, classrooms have the physical and tangible resource; need more tech training; wants to learn more tech tools; there's a lot that he's unfamiliar	

	***Procurement:** purchasing and acquiring tools. ***Proficiency:** having competent using technology. ***Students with special needs:** experience working with students with disabilities ***Connectivity:** connection to the internet. ***Availability:** having enough available devices in the classroom. ***Technological Issues:** equipment problem such as hardware or software failure ***Interruption:** disrupt instructional time ***Student absenteeism:** students being absent from school (whether physical or virtual) ***Distraction:** learning at home during virtual (pandemic) and remote learning		with and is aware of different tools out there, sometimes there's a communicatio n breakdown; information is not disseminated to everyone regarding training; some tools were introduced but is not the best program; there are better tools that are out there and should be introduced, not every student has access to technology at home, the school has to provide devices and wifi (mifi), there are restrictions to certain websites; she finds videos but it can't play because of certain keywords, power fluctuates at her school causing the wifi to be unstable or having no connection at all, student proficiency and experience with technology; some are not exposed to it at home; so they have challenges using technology, not enough apps specific to biology or	

			science, classes are only given 30 laptops; some classes are larger than 30, proficiency; some have more access and exposure to tech than their peers, some are more advanced, student experience with technology; some have no experience at all, she sees how other tools like Canva can be incorporated into lesson, but ELA is hefty, she's worried she might lose content; or there's not enough writing involved if she incorporates tech tools; possibly more apps or tools geared towards ELA, access to technology outside of the classroom, provided students with device (schools were distributing portable wifis and devices) for remote learning, assigning work that involves technology can be a challenge, not every student have the same experience with technology,	

			remedied by teacher assisting, hard to procure science materials, ordered materials before but never received them, students have a hard time navigating the web; provide one-to-one support, students with special needs: they use technology for accommodations but wants to be more inclusive, doesn't receive work back or feedback, need for more stable internet connection, doesn't have enough tools in the class for every student such as a calculator, students have a hard time understanding scientific notation using calculator on the web, some students have no access to internet at home, allows students to work in class, considers assignments involving technology, offers class time to access device and internet, doesn't want to discourage students who do not have access to device and internet at	

			home, she had to share technology on wheels, not enough device for every classroom, the computers in the TOW carts were problematic, a lot were not working, some didn't connect to the wifi, these issues disrupted instructional time because of all the technical issues, also during virtual sessions students were issued portable wifis (mifis) but a lot had problems getting stable connection and because of that students missed out on the virtual sessions especially during the 1st semester of school year 2020-2021, it was chaos, during virtual sessions students were disconnected , some students shared that being at home is a distraction because of their siblings and parents would also tell them to do things in the middle of the virtual session	
RQ1 21. Were the courses offered relevant to your line of work as a teacher? Were the	***Utilization of Tech (Frequency) Before:** This is how often they used technology before the ETTP	• Utilization of Tech (Frequency) Before • Utilization of Tech (Frequency) After	Minimal, no time to implement, Not great for math, teachers	The courses offered by the ETTP are relevant to teachers.

courses offered of any relevance to your content area? Why or why not?	***Utilization of Tech (Frequency) After:** This is how often they used technology after the ETTP. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Online Assessments:** Assessing students understanding online; digital assessments; technology-based assessments. ***Time:** Insufficient amount of time to incorporate into the lesson/classroom. ***Irrelevant:** technology tools that are not important and do not relate to content or teaching. ***Not Content-Specific:** Not relating to content or domain. ***Option:** Having the option to choose which tool to implement and use in the classroom. ***Program Set-Up:** the framework of the program or how the courses were designed and set-up. ***Instructors:** Sharing about the instructors of the courses. ***Relevant:** Courses were relevant for teachers. ***General:** The program offered general tools that teachers can use in the classroom, not specific to a grade level or content. ***Useful:** is purposeful and practical. ***Elementary Level:** set-up or catering towards the elementary level. ***Unfunctional:** Technology didn't work well. ***Connectivity:** connection to the internet. ***Instructional Strategies:** techniques	• Technology Integration • Online Assessments • Time • Irrelevant • Not Content-Specific • Option • Program set-up • Instructors • Relevant • General • Useful • Elementary Level • Unfunctional • Connectivity • Instructional Strategies • Google Apps • Common apps • Mac • Relevant • Content specific • Course development • Relevant to content • Student engagement • Digital citizenship • Technology integration •	can choose which tools to implement (good thing about ETTP), instructors encouraged participants to find relevance of tools, some tools were not relevant to their content area (History tool for making timeline), uses Google Apps daily, Most of the things are elementary level, no reliable technology; poor connection; sometimes the app crashes when too many people are on it, using instructional strategies with technology, Google apps are relevant in the workplace (emails, docs, sheets, etc.), although they are common continues to use it in class, helped become more proficient, was able to take what was taught and incorporate it in her class and lesson, the course was design for general applicability; not particular to any content, waters down/dilute/break down the effect on the impact, some tools were	The courses offered by the ETTP are more generalized tools that teachers can select what to integrate. The ETTP needs to focus on content specific tools for all core content areas. **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	used in the classroom to enhance learning. ***Google Apps:** Applications created by Google such as Google docs, sheet, forms, slides, Gmail, etc. ***Common Applications:** apps and tools introduced by ETTP were already being used by teachers. ***Mac:** experience using mac or apple products. ***Relevant:** Courses were relevant for teachers. ***Content-Specific:** technology tools or applications directly related to the teacher's content or subject. ***Course development:** How the courses were set-up and built. ***Relevant to Content:** applicable to content area ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Digital Citizenship:** A course offered that is design to teach students to use technology responsibly. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments.		relevant like Google Apps; some were pretty good, Canva, Toondoo (obsolete), as a teacher it is relevant; didn't learn just tech tools but how to operate a Mac, comfortable using mac; it was quite helpful, there are some tools that are relevant; there are some tools she doesn't use but may use in the future; 50-50 some that she uses and some she doesn't, yes; it's relevant to both line of work as teacher and content, some of the tools were relevant to certain extent in terms of content, it is relevant for teachers, some tools were not specific to ELA, the program is relevant to her job as a teacher, have a difficult time connecting some tools to the lesson, wants more experiments in the classroom, more hands-on, she also has challenges using some online assessments like kahoot,	

			wants a tool that is specific to chemistry or a tool that helps with accurate measurements , a lot of relevance to ELA, use and implement tools from ETTP into ELA lessons, the courses that were most relevant were Google Apps, digital citizenship, and Classroom Instructions that Work (CITW), with CITIW there were a lot of concepts and tasks that were relevant to ELA, she used and integrated some of those strategies in her classroom, slowly incorporated strategies and more students were engaging by turning in assignments, she also taught students who to navigate online properly, and tools that were relevant, she integrated immediately	
RQ1 22. Please describe any challenges you faced during the technology training for teachers.	***Challenges:** Difficulties, troubles, or encounters during the ETTP. ***Experienced:** Participant has prior experiences using technology. ***Frustrated:** Dissatisfactions about the program	• Challenges • Experienced • Frustrated • Usability • Efficiency • Course Development • Technology Integration • Connectivity • Device • Mac	Low tolerance, ambiguous tools, experienced with technology, frustrated with apps, efficiency, usability, during face-to-face	The ETTP supports participants by providing them with MacBook Air. Some teachers had difficulties switching from PCs to Apple.

	***Usability:** User's experience; ease of use. ***Efficiency:** Making tasks easier. ***Course development:** How the courses were set-up and built. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Connectivity:** connection to the internet. ***Device:** Not having a device to do assignments ***Mac:** experience using mac or apple products. ***Adobe:** experience using adobe programs offered during the ETTP. ***Time:** Time to work on assignments on top of teaching duties. ***Infrastructure:** physical structure of buildings, power supply, etc. ***Technical:** some parts of the program required more training; more high-tech. ***Subscriptions:** required fees ***Dragging:** felt like the program went on for a long time ***Effort:** an attempt to complete a task. ***No challenges:** did not experience any challenge during time in the ETTP ***Instructors:** Sharing about the instructors of the courses. ***Time Management:** using one's time effectively and productively ***Laptops are slow:** the processor is slow making the computer operate slow ***Collaboration:** working with others to achieve tasks	• Adobe • Time • Infrastructure • Technical • Subscription • Dragging • Effort • No challenge • Time management • Laptops are Slow • No major challenges • Connectivity • Staying focused	participants had difficulties with connection (slow), some people did not have laptops to use so they had loaners until the program provided the laptops, used to PC; had a difficult time using Mac in the beginning but got used to it from the program, also had challenges using adobe platform; impatient, electricity would fluctuate; power outage, time to complete assignments, technical aspects; installing apps; difficult; adobe; took a lot of time to answer questions; confusion occurred with adobe; experienced problems, in order to continue using adobe; required subscription, staying up late to complete assignment, putting the time and effort to complete assignments after work, personally she didn't face any challenges; instructors were clear	Teachers felt stressed juggling between teacher responsibility and completing assignments. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD**

	***No major challenges:** did no encounter major challenges or obstacles during ETTP ***Connectivity:** connection to the internet. ***Staying Focused:** to persist and complete tasks		with expectations, she managed her time well; she turned in assignments before they were due, completing assignments on top of teacher responsibility, requires commitment, courses were five weeks long, also have to commit to asynchronous, time to learn the tools introduced, face-to-face was hindered by the pandemic, everything was done asynchronously, the laptop (MAC) that they give out have little memory therefore it runs so slowly, and the tools introduced are high performing which also requires bigger storage, turning in assignments on time was a challenge she faced, time and energy management, stayed back at work because the wifi is better, she also stayed back to remain focus, wanted to learn so she had to discipline herself, it was	

			battle managing ETTP workload and other responsibilities on top of self-care, it was chaotic but she persisted, didn't want to start something and finish it (ETTP)	
RQ2 23. How would teachers and staff benefit from completing the educational technology training program? How has completing the educational technology training program beneficial to you as a _____ teacher?	***Laptop Initiative:** incentive for completing the program. Participants are given a free MacBook Air to keep. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Usability:** User's experience; ease of use. ***Testimonial of others:** Based on others' experience during their time in the ETTP. ***Awareness:** bring awareness or make aware of the different tools out there that can be used in the classroom. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***Instructors:** Sharing about the instructors of the courses. ***CITW:** A course called Classroom Instructions That Work with Technology ***Instructional Strategies:** techniques used in the classroom to enhance learning. ***Digital Citizenship:** A course offered that is design to teach students to use technology responsibly.	• Laptop Initiative • Technology Integration • Usability • Testimonial of others • Awareness • Community of Educators • Instructors • CITW • Instructional Strategies • Digital Citizenship • Provided Tools • Background and Experience • Elementary Level • Colleagues • Staff • Teachers • Google Apps • Depends on the individual • Exposure • Comfortable • Knowledgeable • Mac • Tech Tools • Experience • Enhance content • Stay abreast • Relevant • PC user • Awareness • Teaches how to navigate and utilize technology and tools • More interaction and engagement • Student engagement • Efficient	Free laptop, tech integration, made aware of certain tools, meeting new people and using them as resources, Instructors are another means of network and using them as resources when they come across technological issues or need ideas, CITW showed different strategies to integrate technology in the classroom, the courses were useful, program provided tools and programs to implement in the classroom, taught different video tools to enhance lesson; integrates videos in her math and computer science class, teachers do not have his experience and background in science and	Teachers can procure a laptop by completing the ETTP. The ETTP introduces strategies that are helpful in the classroom. The ETTP provided tools that enhanced the lesson and engaged students. **Theme 3: Technology PD Increases Teacher Confidence** **Theme 4: Teachers Learn New Tools**

	***Provided Tools:** introduced tools to integrate and use in the classroom ***Background and Experience:** educational background and teaching experience ***Elementary Level:** set-up or catering towards the elementary level. ***Content-Specific:** technology tools or applications directly related to the teacher's content or subject. ***Colleagues:** support from coworkers ***Staff:** other employees at the school level that are not teachers. ***Teachers:** employee at the school level that work directly in the classroom with students ***Google Apps:** Applications created by Google such as Google docs, sheet, forms, slides, Gmail, etc. ***Depends on the individual:** if they find it relevant to their teaching or not; if they would like to utilize the tools shared or introduced during ETTP ***Exposure:** provide more opportunities for other teachers by sending more teachers to conferences to be exposed. ***Comfortable:** knows how to use the technology tools. ***Knowledgeable:** to be well informed ***Mac:** experience using mac or apple products. ***Tech Tools:** a variety of technological tools participants used and integrated in their classroom. ***Experience:** provide more knowledge and exposure to teachers		technology, Elementary teachers would benefit more from the ETTP than high school, content specific; not really, gets more support from colleagues, free laptop, with staff not all is relevant; most of the tools introduced are geared towards classroom use, teachers, focuses more on integration of technology in the classroom rather than the general workplace (ex. Office), teachers; learn new tools; more aware of new tools; depends on the teacher if they already have a lot in their toolkit, Google apps is relevant at the administrative level, some courses are not relevant to admin, depends on the teachers; some of them dismiss technology; some disregard it as important; some have higher ceilings in terms of tech use; if teachers are already familiar with technology	

	who have not completed the ETTP. ***Enhance content:** the use of technology helps improve and reinforce the content ***Stay Abreast:** to stay up-to-date with technology* ***Relevant:** integrating technology to lesson; cohesive; flow. ***PC User:** comfortable using Windows OS ***Awareness:** bring awareness or make aware of the different tools out there that can be used in the classroom. ***Teaches how to navigate and utilize technology and tools:** the ETTP provides participants with experiences on how to work and use educational technology and tools ***More interaction and engagement:** more interaction with technology among teachers during meetings ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Efficient:** the use of technology in the class can make tasks easier, it can be efficient, and assistive. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity.		and they join the program then they won't learn much, ETTP exposes teachers to different platforms; there's probably something new for everyone to learn, don't be afraid to try new things, allows you to get comfortable and play around with the tool, comfortable trying new ideas and tools; a good mentality for teachers who are in ETTP; don't be afraid to try it; technology is evolving and we have to learn to evolve with it and become good with the tools out there, the program is beneficial; especially when it comes to learning the different operating systems (PC and Mac), ETTP is a great opportunity to get comfortable using Mac; encourages teachers to try it out, ETTP exposes you to tech tools; she learned about Canva through her coworker who learned it	

			from ETTP, encourages teachers to give ETTP a try to add more tools to their toolkit, Google apps is integrated every day; students are always using it in her class, regarding content-specific; it wasn't as helpful; although it exposed her to different tools that she can use, beneficial for teachers who haven't completed the ETTP; especially those with little experience with tech, gives out free laptop; opportunity for those teachers who have. Difficult time procuring laptop; this is their opportunity; you get a lot out of the program; learn new things; plus if they pass; they get the laptop; keep the laptop, learned tools to enhance their content, was able to add more tools to his toolkit, gave him a perspective how tech needs to be embedded in the classroom, gained a Mac,	

			had a difficult time navigating mac the first time, she was used to the commands in PC, the ETTP made her aware of different software she hasn't tried; adobe; solo (program) for ELL students, one example is during staff meeting some teachers do not know how to navigate certain tools, for example Kahoot, when ETTP launched she noticed that meetings and PDs are more fun and engaging because of technology, it has also helped the ELA department, she hears students talk about the tools they used and student have so much fun, technology can be efficient in the classroom, she realized that there were more participation when she implemented strategies fromE TTP, she reflected and realized there are ways to improve tech use for students,	
RQ2 24. Please provide any additional information or	***Student Engagement:** Engaging student;	• None • Student Engagement	Gaining attention, integrating tech in small	The ETTP encourages teachers to use technology in

experiences you have about integrating technology in your classroom. As a _____ teacher, what other information or experience do you have about integrating technology in your classroom?	getting their attention; learning; curiosity. ***Tool-Kit/Toolbox/Toolbelt:** Having a collection of various tools that can be used in various ways. ***None:** No additional information to add. ***Afraid:** Teachers are afraid to use technology because they are scared to break it. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Confidence After:** This describes the participants' confidence level after completing the ETTP. ***Positive Experience:** positive experience using technology in the classroom. ***Provided Tools:** introduced tools to integrate and use in the classroom ***Option:** Having the option to choose which tool to implement and use in the classroom. ***Technology is a Tool:** Teachers must not rely on the tools for teaching students because it is not the tools, itself, that help students learn. It is the way in which the tool is used. ***Networking:** helping others use technology ***Efficiency:** Making tasks easier. ***Vernier:** Software and Technology that supports teacher sciences. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***None:** no additional information ***Google Apps:** Applications created by Google such as	• Tool-Kit/Toolbox/Toolbelt • Afraid • Technology Integration • Confidence After • Positive Experience • Provided Tools • Option • Technology is a tool • Networking • Efficiency • Vernier • Student Engagement • Google Apps • Classroom Management • Still learning • Consideration • Competence • Reflection • Accountability • Procuring chemistry tools • More training on science tools • Introductory course	increments in the classroom, variety of tech tools, collection of tools, afraid of breaking technology, using and exploring how to use different tools; when she figures it out, she becomes more confident, positive experience using technology in classroom especially when confident, **ETTP encourages teachers to dive into technology using the different tools and apps and to explore it further, ETTP gives you the option and freedom to choose which tools you would like to use and integrate,** helped another teacher access online textbook and set up student accounts, **uses technology to make tasks easier**, uses vernier for hands-on; students collect data and draw conclusion from there, students enjoy hands-on; students understand	the classroom and gives offers a variety of tools. The ETTP presents teachers with different tools and encourages teachers to choose which tools they are comfortable integrating. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD**

	Google docs, sheet, forms, slides, Gmail, etc. ***Classroom Management:** variety of skills and techniques that teachers use to keep students organized, orderly, focused, attentive, on task, and academically productive during a class. ***Still learning:** still finding new ways and new strategies; practicing. ***Consideration:** takes into consideration student experience with technology ***Competence:** having the skills or proficiency with technology ***Reflection:** thoughts and considerations ***Accountability:** responsibility of teachers to ensure learning is taking place ***Procuring Chemistry tools:** technology geared towards chemistry ***More Training on Science Tools:** training should be provided on how to safely use science tools ***Introductory Course:** offer an introductory course for students on how to use technology *		lesson more, none to add, utilized google apps a lot especially google classroom; blogging; also integrated into her clubs/extracurricular activity, good classroom management especially with cell phone use in the classroom; it can be a distraction; takes away from learning if not used properly; need to set expectations on when to use cell phones responsibly, no additional information to add, still learning different ways to integrate; learning different programs; **she's taking into consideration student levels and proficiency because not all students have the same experience with technology; she doesn't want to overwhelm students.** From experience, teachers need to be competent and familiar with the technology, technology	

			can be attractive but you need to know how to use it because students will have questions or come across problems and you need to be able to assist them, reflect on its benefits in terms of moving the content forward, will it engage? These are important reflection, engagement needs to come with accountability, make the most out of technology in the classroom, make it purposeful, she has some tools that she doesn't know how to use so they just sit in her class unused, students have difficulty with basic computer skills, students should be offered introductory course for technology, technology has made her teaching a lot easier, students enjoy when she incorporates technology, it is beneficial for both teachers and students,	
RQ2 25. Please provide any additional information or experiences while you were	***Cohorts:** grouping applicants into cohorts based on what schools they work at.	• Cohorts • Face-to-Face • Other Training/PD • Instructors • None	Cohorts were a good idea, Face-to-face interaction, instructors	Participants encourage others to complete the ETTP.

in the technology training for teachers.	***Face-to-face:** once a week, participants and instructors meet and interact at the same location. ***Other Training/PD:** These are Training or Professional Development participants attended aside from the Educational Technology Training Program (ETTP). ***Instructors:** Sharing about the instructors of the courses ***None:** No additional information to add. ***Pattern:** observed certain pattern relating to participants after completing the ETTP. ***Encourage:** encourages other teachers who have not completed the ETTP to do so. ***Confidence After:** This describes the participants' confidence level after completing the ETTP. ***Choices:** Offer different tools and have them select which would work best for them. ***Self-Taught:** acquired new skills or knowledge through one's self and initiative or either through tutorials such as videos. ***Laptop Initiative:** incentive for completing the program. Participants are given a free MacBook Air to keep. ***Trends:** a general direction in which technology is changing and developing. ***Student Engagement:** Engaging student; getting their attention; learning; curiosity. ***Learning New Strategies:** learning new strategies from different teachers from different levels and	• Pattern • Encourage • Confidence After • Choices • Self-taught • Laptop initiative • Trends • Student Engagement • Learning New Strategies • Network with other teachers • Strategies for Special Education • Choice between PC or apple • Collaboration • Community of educators • Time management • Priorities • Techniques	were competent, assisted other teachers who were not competent, Master's program experience, notices that many participants became instructors for the ETTP or became district leaders, from experience, she encourages others to take it as it help her become a better teacher, became more confident using tech in the classroom, ETTP should provide other options to teachers rather than just one tool, feedback: instructors need to be more thorough with explanation rather than having participants read to find answers; some teachers are shy to ask questions, earn a free laptop, takes the initiative to stay abreast and to keep up with technological trends; this helps with engaging learners, always seek to develop herself professionally , encourages teachers to	**Theme 2: Ongoing Technology Training/PD** **Theme 4: Teachers Learn New Tools**

	how they integrate technology ***Network with other teachers:** getting ideas from other teachers ***Strategies for Special Education:** learning strategies for students with disabilities; to be more inclusive ***Choice Between PC or Apple:** ETTP should offer chose based on operating system preference. ***Collaboration:** working together to create or achieve something. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***Time Management:** using one's time effectively and productively ***Priorities:** something important ***Techniques:** timing techniques when doing work		give it a try, ETTP gave her the opportunity meet other teachers from different schools; learning different strategies from different levels; learned different ways teachers incorporate and use technology, some participants are comfortable with PC over Mac and vice versa, a lot of collaborative learning during her time in the ETTP, enjoys being in groups and learning together, when she's lost there's always someone in the group willing to help, she's more confident because others are at the same level while others are always supportive, the instructors are always welcoming and supportive, she advises to dedicate a day or two per week to do your work and to minimize procrastinatio n, she advises to rearrange priorities, dedicate 5 hours of the	

			two days to do work that way you do not neglect your other priorities, she shared a timing technique called the pomodoro technique; time yourself then take breaks in between but if you have momentum continue without breaks.	
RQ2 26. Do you think you still need support in regards to technology integration? Do you feel the need for additional support in regards to technology integration specific to your course content?	***School-Provided Programs:** These are programs that their school has adopted and is expected to be integrated in the classroom. ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments. ***Community of Educators:** reaching out to other teachers for support and getting ideas. ***No Support Needed:** does not need support at the moment. ***Additional Support:** still needs additional support with regards to tech integration ***Evolution:** Technology is always evolving, advancing, and changing, ***Growth:** there's always room to grow and improve ***Instructional Strategies:** techniques used in the classroom to enhance learning. ***Labs:** to provide students with conceptual and theoretical knowledge to help them learn scientific concepts, and through scientific	• School-provided programs • Technology integration • Community of Educators • No support needed • Additional Support • Evolution • Growth • Instructional Strategies • Labs • Procurement • Time • Open • Follow-up PD • Subjective • Game-based learning • Content-specific • Beneficial • More time • Diverse participants • Content-specific apps • New programs and tools • Other training/PD • Technology Integration	Curious about new program for grading, more professional development , can find answers on YouTube, can reach out to department or other teachers for ideas, Knows where to seek information when she gets stuck, not worried, feels that she needs the support all the time, apps are upgrading and changing, even feeling confident after the ETTP; there's always room for growth, there's always new strategies being introduced, always open to learning new things, willing to learn new things to become a better teacher, more time for labs so students	Teachers are always willing to learn new forms of technology or tools. Teachers need continuous PDs and Training to stay abreast. Teachers want to learn content-specific applications and tools. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD**

	methods, to understand the nature of science. ***Procurement:** purchasing and acquiring tools. ***Time:** more time to teach science (science is only a semester-long course) ***Open:** open to learning new information and new opportunities ***Content-Specific:** technology tools or applications directly related to the teacher's content or subject. ***Follow-up Professional Development:** to serve as refresher or to be introduced to latest tools especially for those teachers who completed the program a while back. ***Subjective:** influenced by experience or opinion; preferences achieve something. ***Game-based Learning:** an active learning technique where games are used to enhance student learning. ***Content-Specific:** technology tools or applications directly related to the teacher's content or subject. ***Beneficial:** useful and valuable (program) ***More time:** the need for more time in the program ***Diverse participants:** participants come from different levels (K-23) and teach different content ***Content-specific Apps:** application relevant to content or domain. ***New Programs and Tools:** willing to learn more technology to integrate in the classroom ***Other Training/PD:** These are Training or Professional		understand ideas and concepts, does not need support for integration; more support with procuring hardware for labs, need more time for science, willing to learn new information regarding technology; unsure if the support should come from school or the program; support should be readily available should teacher need it, absolutely; wishes for more PDs relating to content area, to have a follow-up PD; to refresh teachers; to show new and trending ed tech tools, if the training or support is based on what he already knows; then no; if there are experts on new tools he would love to attend that training; it can be subjective; it might work for some but not all; depends on teaching style, need to offer more PDs or training on Game-based learning, need more content-specific tools for social	

	Development participants attended aside from the Educational Technology Training Program (ETTP). ***Technology Integration:** Integrating technology or using technology in the classroom to enhance lesson/content and assessments.		studies; he's sure that there are tools out there that may be useful for SS; content-specific PDs need to be improved, there always room to grow; it's good to have the support ready for when she needs it; especially when there's new forms of technology; technology is always changing, she would like more apps geared towards her content, sees that ELA and math are always prioritized, IXL has other content areas embedded but it doesn't cater to high school, would like to learn new strategies to incorporate more technology for basic parts of ELA like reading stories or writing; content-specific strategies and tools; need more time to learn more tools, ETTP was very general; needs more content specific tools; although the participant pool was diverse, it was good because technology is universal, she would	

			appreciate it if the ETTP offered tools that can be used for labs, focus on tools relative to science, doesn't need support in tech integration but is willing to learn newer tools, still not knowledgeable or skilled with certain program because there are some changes within the programs, would love to have more training based on those changes, would also like to continue integrating IXL more, break the PDs into smaller session vs. a one day training lasting for hours that way teachers can retain the information, have monthly PDs on how to implement technology properly and effectively, it's best to do PDs in increments, would appreciate continuous support regarding technology integration and content specific PDs and support	
RQ2	***Support:** from key management	• Support • Involve the teachers	Transparency, include teachers in	District needs to find ways

27. How can your administrator(s) and the key management leaders (Commissioner of Education, Associate Commissioner, Technology Director, Program Directors, etc.) continue to support you in regards to the integrating technology in your classroom effectively?	leaders/school district leaders. ***Involve the Teachers:** to involve the teachers in the decision making especially when purchasing programs to be integrated into the curriculum (textbooks, software, hardware, etc.). ***Transparency:** Clear communication and involvement with all stakeholders in the district. ***Spending:** minimize spending on branded/propriety tools. ***Connectivity:** connection to the internet. ***Listen:** Listen to what teachers have to say. ***Needs:** Try and meet the needs of teachers in terms of support, resources, etc. ***Conversation:** leaders to continue having conversations with teachers regarding their needs. ***Quick:** Respond to request quicker ***Survey:** Create a form/survey to see what teachers need in the classroom in terms of technology and support, ***Exposure:** provide more opportunities for other teachers by sending more teachers to conferences to be exposed. ***Other Training/PD:** These are Training or Professional Development participants attended aside from the Educational Technology Training Program (ETTP). ***Procurement:** purchasing and acquiring tools. ***Experts:** person who's knowledgeable in technology	• Transparency • Spending • Connectivity • Listen • Needs • Conversation • Quicker • Survey • Exposure • Other Training/PD • Procurement • Expert • Update Technology • Sharing • Content-specific • Visit • Time • Providing feedback • More training in science tools • Inform teacher • Continue to provide PD/Training • Observation	decision making, minimize spending on proprietary tools, Improve bandwidth, improve connectivity, No one size fits all, listen to teachers and their concerns, Support teachers, teachers want to improve learning, listen and provide the support, leaders need to keep asking what teachers need, need quicker response and procuring technology, more teachers need to be send out to be exposed, procuring materials requested for, provide access to materials such as utilizing the van for field trips, to provide more PDs, hire experts who's competent in technology to do training, continuous PDs; to support tech in the classroom, WiFi is sometimes slow on campus, District needs to continuously updated technology ever "x" number of years; over	to improve infrastructure. District leaders need to involve teachers in the decision making especially with programs and technology. District leaders need to communicate and provide effective feedback on technology use. Technology needs to be constantly upgraded and replenished over the years. District leaders need to visit schools and observe and converse with teachers about improving learning. District leaders need to continue to provide training or professional relating to technology integration. **Theme 1: Content Specific Technology Training** **Theme 2: Ongoing Technology Training/PD**

	***Update Technology:** some tools need to be updated ***Sharing:** providing teachers the opportunity to share best practices and up-to-date tools. ***Visit:** district leaders need to visit the campuses ***Time:** ample time for preparation ***Providing Feedback:** helpful response to someone's work; constructive remarks ***More training in science tools:** provide training on how to use different science tools in the classroom ***Procurement:** purchasing and acquiring tools. ***Inform teacher:** teachers need to be made aware of changes within the curriculum or better planning ***Continue to Provide PD/Training:** continuous training and PD to continue supporting teachers in technology use ***Observation:** formal or informal observation of teaching while the class is in session.		time it slows down or breaks; this is to ensure that tech is readily available for student use, similar to a PD; but teachers share best tools they're using; teachers can add more to their toolkit/toolbox, the need for more US history technology tools; more PDs that are useful and effective, visit schools and ask teachers what their needs are, involve teachers in the decision process especially those relating to curriculum, teachers are the ones implementing the curriculum and programs invested, they should get a say as to what they are going to get or use in the classroom, give teachers ample time to prepare especially the shift to virtual class; blackboard was thrown to teachers quickly; teachers had to learn to use and navigate BB within a month, even after a month, teachers are still figuring out how to fix	

			and troubleshoot parts of it; advance warning if teachers are going to implement new tools and ample time for training. Making schools more technologicall y-ready, better infrastructure and connectivity to prepare students for 21st century, feedback regarding technology use especially during observation, they should give tips and have that productive conversation about technology and how it can be better implemented in the classroom, provide training on lab-based technology, train science teachers to use science tools, wants to know what happened to her orders, needs accountability , reliable technology for students, Chromebooks are not working, technology shuts down or is corrupted. Whenever changes are made within the curriculum to inform	

			teachers ahead so they can properly plan, continuous PDs to update teachers and provide more training relating to technology and technology integration, do a periodic check on teachers and do observations versus scrutinize, they can see what works and what doesn't, they can see which are needs more support.	

Appendix D: Project-Based Learning Rubric for Administrators

Note: This rubric can be used by teachers and administrators to reflect on practices implementing PBL in the classroom. Adapted from PBL Works "Project Based Teaching Rubric," by the Buck Institute for Education (https://my.pblworks.org/resource/document/project_based_teaching_rubric?_ga=2.175739746.1773413645.1636500975-1191270952.1632207434).

Project Based Teaching Practice	Beginning PBL Teacher	Developing PBL Teacher	Gold Standard PBL Teacher
Design & Plan	• Project includes some Essential Project Design Elements, but not at the highest level of the Project Design Rubric. • Plans for scaffolding and assessing student learning lack some detail; project calendar needs more detail, or is not followed. • Some resources for the project have not been anticipated or arranged in advance.	• Project includes all Essential Project Design Elements, but some are not at the highest level of the Project Design Rubric. • Plans for scaffolding and assessing student learning lack some details; project calendar allows too much or too little time, or is followed too rigidly to respond to student needs. • Most resources for the project have been anticipated and arranged in advance.	• Project includes all Essential Project Design Elements as described on the Project Design Rubric. • Plans are detailed and include scaffolding and assessing student learning and a project calendar, which remains flexible to meet student needs. • Resources for the project have been anticipated to the fullest extent possible and arranged well in advance.
Align to standards	• Criteria for products are given but are not specifically derived from standards. • Scaffolding of student learning, critique and revision protocols, assessments and rubrics do not refer to or support student achievement of specific standards.	• Criteria for some products are not specified clearly enough to provide evidence that students have met all targeted standards. • Scaffolding of student learning, critique and revision protocols, assessments and rubrics do not always refer to or support student achievement of specific standards.	• Criteria for products are clearly and specifically derived from standards and allows demonstration of mastery. • Scaffolding of student learning, critique and revision protocols, assessments and rubrics consistently refer to and support student achievement of specific standards.
Build the culture	• Norms are created to guide project work, but they may still feel like "rules" imposed and monitored by the teacher.	• Norms to guide the classroom are cocrafted with students, and students are beginning to internalize these norms.	• Norms to guide the classroom are co-crafted with and self-monitored by students. • Student voice and choice is regularly leveraged and

	• Students are asked for their ideas and given some choices to make, but opportunities for student voice and choice are infrequent or are only related to minor matters. • Students occasionally work independently, but often look to the teacher for guidance. • Student teams are often unproductive or require frequent intervention by the teacher. • Students feel like there is a "right answer" they are supposed to give, rather than asking their own questions and arriving at their own answers; they are fearful of making mistakes. • Value is placed on "getting it done" and time is not allowed for revision of work; "coverage" is emphasized over quality and depth.	• Student voice and choice is encouraged through intentionally designed opportunities, e.g., when choosing teams, finding resources, using critique protocols, or creating products. • Students work independently to some extent, but look to the teacher for direction more often than necessary. • Student teams are generally productive and are learning what it means to move from cooperation to effective collaboration; the teacher occasionally has to intervene or manage their work. • Students understand there is more than one way to answer a driving question and complete the project, but are still cautious about proposing and testing ideas in case they are perceived to be "wrong." • The values of critique and revision, persistence, rigorous thinking, and pride in doing high-quality work are promoted by the teacher but not yet owned by students.	ongoing, including identification of real-world issues and problems students want to address in projects. • Students usually know what they need to do with minimal direction from the teacher. • Students work collaboratively in healthy, high-functioning teams, much like an authentic work environment; the teacher rarely needs to be involved in managing teams. • Students understand there is no single "right answer" or preferred way to do the project, and that it is OK to take risks, make mistakes, and learn from them. • The values of critique and revision, persistence, rigorous thinking, and pride in doing high-quality work are shared, and students hold each other accountable to them.
Manage Activities	• The classroom features some individual and team work time and small group instruction, but too much time is given to whole group instruction. • Classroom routines and norms for project work time are not clearly established; time is not used productively. • Schedules, checkpoints, and deadlines are set, but they are loosely followed or unrealistic; bottlenecks impede workflow. • Teams are formed using either a random process	• The classroom features individual and team work time, whole group and small group instruction, but these structures are not well-balanced throughout the project. • Classroom routines and norms are established for project work time, but are not consistently followed; productivity is variable. • Realistic schedules, checkpoints, and deadlines are set, but more flexibility is needed; bottlenecks sometimes occur.	• The classroom features an appropriate mixture of individual and team work time, whole group and small group instruction. • Classroom routines and norms are consistently followed during project work time to maximize productivity. • Project management tools (group calendar, contract, learning log, etc.) are used to support student self-management and independence.

	(e.g., counting off) or students are allowed to form their own teams with no formal criteria or process.	• Generally well-balanced teams are formed, but without considering the specific nature of the project; students have too much voice and choice in the process, or not enough.	• Realistic schedules, checkpoints, and deadlines are set but flexible; no bottlenecks impede workflow. • Well-balanced teams are formed according to the nature of the project and student needs, with appropriate student voice and choice.
Scaffold Learning	• Students receive some instructional supports to access both content and resources, but many individual needs are not met. • Teacher may "front-load" content knowledge before the project launch, instead of waiting for "need to know" points during the project. • Students gain key success skills as a side effect of the project, but they are not taught intentionally. • Students are asked to do research or gather data, but without adequate guidance; deeper questions are not generated based on information gathered.	• Most students receive instructional supports to access both content and resources, but some individual needs are not met. • Scaffolding is guided to some extent by students' questions and "need to knows" but some of it may still be "front-loaded." • Key success skills are taught, but students need more opportunities to practice success skills before applying them. • Student inquiry is facilitated and scaffolded, but more is needed; or, teacher may over-direct the process and limit independent thinking by students.	• Each student receives necessary instructional supports to access content, skills, and resources; these supports are removed when no longer needed. • Scaffolding is guided as much as possible by students' questions and needs; teacher does not "front-load" too much information at the start of the project, but waits until it is needed or requested by students. • Key success skills are taught using a variety of tools and strategies; students are provided with opportunities to practice and apply them, and reflect on progress. • Student inquiry is facilitated and scaffolded, while allowing students to act and think as independently as possible.
Assess Student Learning	• Student learning of subject-area standards is assessed mainly through traditional means, such as a test, rather than products; success skills are not assessed. • Team-created products are used to assess student learning, making it difficult to assess whether individual students have met standards.	• Project products and other sources of evidence are used to assess subject area standards; success skills are assessed to some extent. • Individual student learning is assessed to some extent, not just team-created products, but teacher lacks adequate evidence of individual student mastery. • Formative assessment is used on several occasions,	• Project products and other sources of evidence are used to thoroughly assess subject-area standards as well as success skills. • Individual student learning is adequately assessed, not just team-created products. • Formative assessment is used regularly and frequently, with a variety of tools and processes.

	• Formative assessment is used occasionally, but not regularly or with a variety of tools and processes. • Protocols for critique and revision are not used, or they are informal; feedback is superficial, or not used to improve work. • Students assess their own work informally, but the teacher does not provide regular, structured opportunities to do so. • Rubrics are used to assess final products, but not as a formative tool; or, rubrics are not derived from standards.	using a few different tools and processes. • Structured protocols for critique and revision and other formative assessments are used occasionally; students are learning how to give and use feedback. • Opportunities are provided for students to self-assess their progress, but they are too unstructured or infrequent. • Standards-aligned rubrics are used by the teacher to guide both formative and summative assessment.	• Structured protocols for critique and revision are used regularly at checkpoints; students give and receive effective feedback to inform instructional decisions and students' actions. • Regular, structured opportunities are provided for students to self-assess their progress and, when appropriate, assess peers on their performance. • Standards-aligned rubrics are used by students and the teacher throughout the project to guide both formative and summative assessment.
Engage and Coach	• The teacher has some knowledge of students' strengths, interests, backgrounds, and lives, but it does not significantly affect instructional decision-making. • Project goals are developed without seeking student input. • Students are willing to do the project as if it were another assignment, but the teacher does not create a sense of ownership or fuel motivation. • The driving question is presented at the project launch and student questions are generated, but they are not used to guide inquiry or product development. • Expectations for the performance of all students are not clear, too low, or too high.	• The teacher has general knowledge of students' strengths, interests, backgrounds, and lives and considers it when teaching the project. • Project goals and benchmarks are set with some input from students. • Students are excited by the project and motivated to work hard by the teacher's enthusiasm and commitment to their success. • Students' questions guide inquiry to some extent, but some are answered too quickly by the teacher; students occasionally reflect on the driving question. • Appropriately high expectations for the performance of all students are set and communicated by the teacher.	• The teacher's knowledge of individual student strengths, interests, backgrounds, and lives is used to engage them in the project and inform instructional decision-making. • Students and the teacher use standards to co-define goals and benchmarks for the project (e.g., by co-constructing a rubric) in developmentally appropriate ways. • Students' enthusiasm and sense of ownership of the project is maintained by the shared nature of the work between teachers and students. • Student questions play the central role in driving the inquiry and product development process; the driving question is actively used to sustain inquiry.

	• There is limited relationship-building in the classroom, resulting in student needs that are not identified or addressed. • Students and the teacher informally reflect on what and how students are learning (content and process); reflection occurs mainly at the end of the project.	• Student needs for further instruction or practice, additional resources, redirection, troubleshooting, praise, encouragement, and celebration are identified through relationship-building and close observation and interaction. • Students and the teacher occasionally reflect on what and how students are learning (content and process).	• Appropriately high expectations for the performance of all students are clearly established, shared, and reinforced by teachers and students. • Individual student needs are identified through close relationships built with the teacher; needs are met not only by the teacher but by students themselves or other students, acting independently. • Students and the teacher reflect regularly and formally throughout the project on what and how students are learning (content and process); they specifically note and celebrate gains and accomplishments.

Appendix E: Project-Based Learning Brainstorming Template

School:
Content:
Submitted by:

NGSS Priority Standards:

Career Academy Pathway(s):

Potential PBL Activities:

Essential Questions:

Appendix F: Project-Based Learning Activity Template

Instructions: Complete the following information about your PBL activity.

Project Title:

NGSS Priority Standards:

Career Academy Pathway:

Stage 1: Identify Desired Results	
What are the essential questions?	
What is the project activity goals?	
Stage 2: Determine Assessment Evidence	
What is the product of the project activity?	

Through what Performance tasks will students demonstrate their learning?	

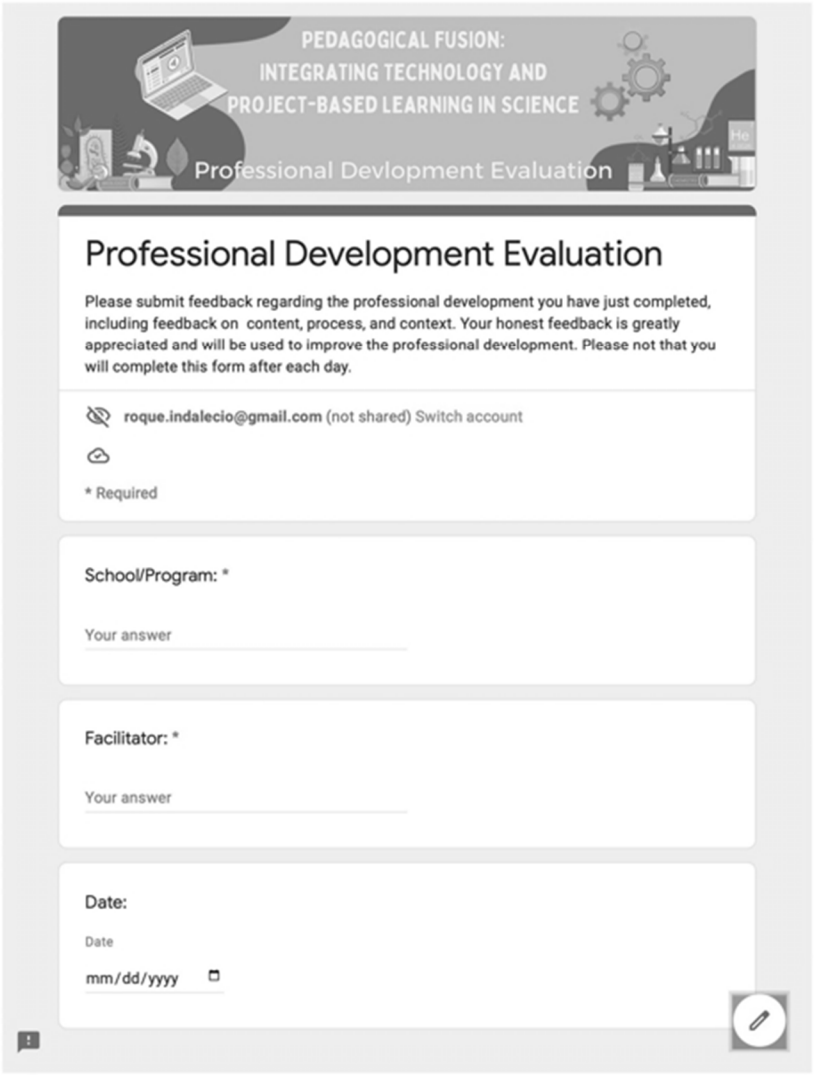
How will we evaluate whether students have achieved the desired results in fair and consistent ways? (Add rubric, checklist, and other forms of assessment tools here)	
What additional evidence will be collected for other desired results? (Examples include student reflections, mid-point project check-ins, peer evaluations etc.)	

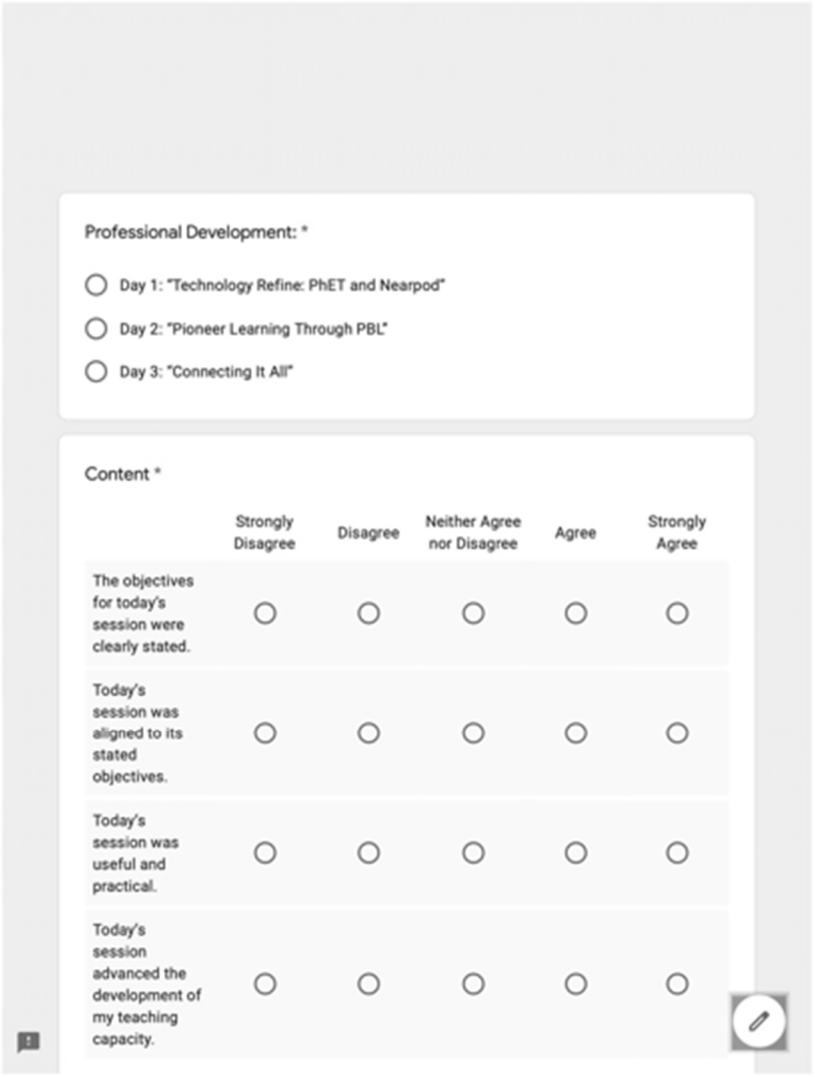
Stage 3: Plan Learning Experiences and Instruction

What activity elements will lead to the achievement of the project's desired results?	
What is the project activity sequence, schedule, and timeline?	

What materials and resources are needed?	
What instructional strategies will be utilized? (For example, plan for collaborative learning and self-directed learning.)	

Appendix G: Professional Development Teacher Evaluation





Professional Development: *

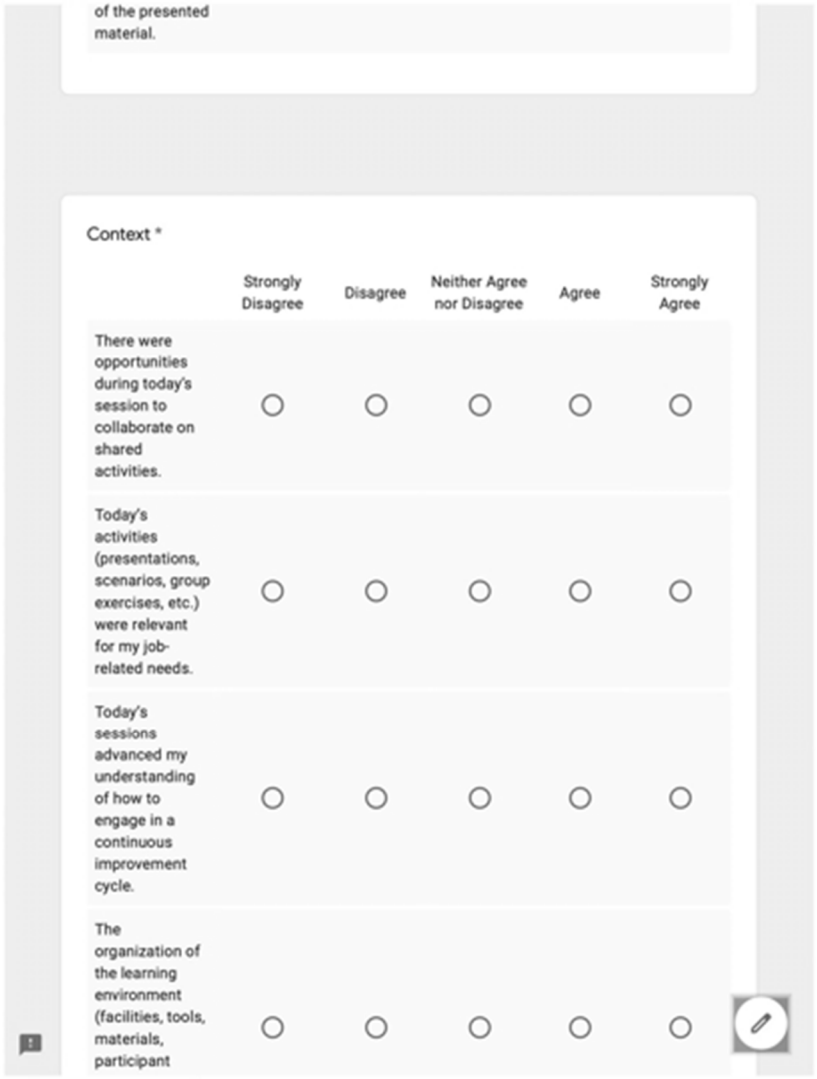
- ○ Day 1: "Technology Refine: PhET and Nearpod"
- ○ Day 2: "Pioneer Learning Through PBL"
- ○ Day 3: "Connecting It All"

Content *

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The objectives for today's session were clearly stated.	○	○	○	○	○
Today's session was aligned to its stated objectives.	○	○	○	○	○
Today's session was useful and practical.	○	○	○	○	○
Today's session advanced the development of my teaching capacity.	○	○	○	○	○

Process *

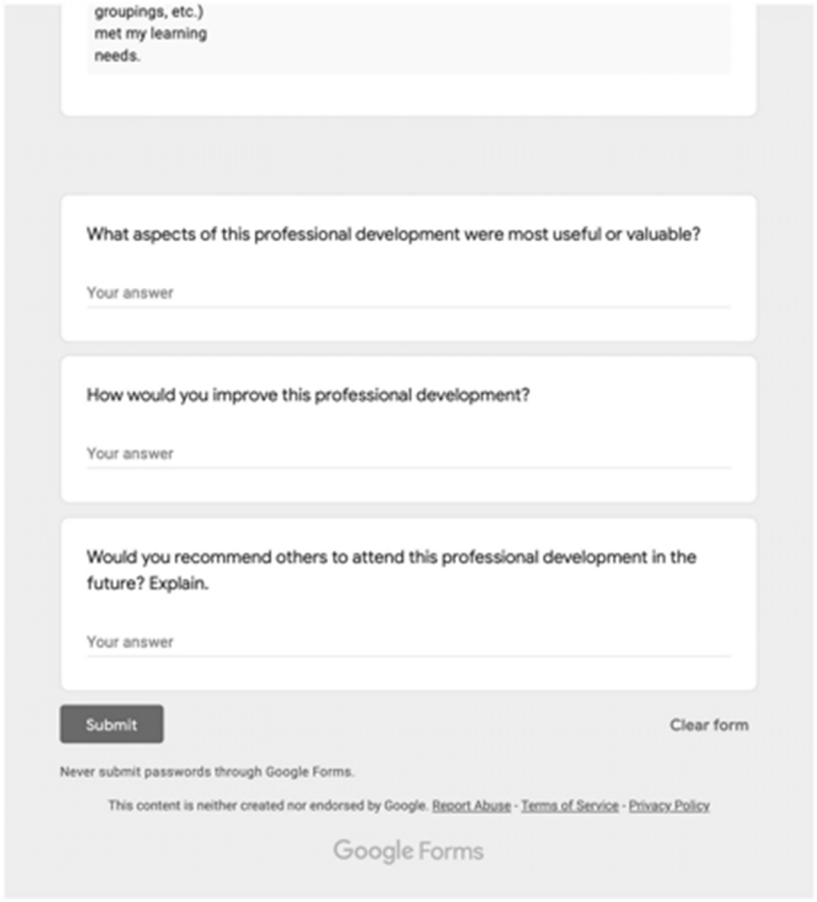
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Today's activities (presentations, scenarios, group exercises, etc.) increased my capacity to use data to improve my practice.	○	○	○	○	○
The facilitators of today's session effectively modeled appropriate instructional strategies.	○	○	○	○	○
The facilitators of today's session incorporated our experiences into today's activities (presentations, scenarios, group exercises, etc.)	○	○	○	○	○
Time was allocated effectively today to deepen my understanding	○	○	○	○	○



of the presented material.

Context *

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
There were opportunities during today's session to collaborate on shared activities.	○	○	○	○	○
Today's activities (presentations, scenarios, group exercises, etc.) were relevant for my job-related needs.	○	○	○	○	○
Today's sessions advanced my understanding of how to engage in a continuous improvement cycle.	○	○	○	○	○
The organization of the learning environment (facilities, tools, materials, participant	○	○	○	○	○


groupings, etc.)
met my learning
needs.
What aspects of this professional development were most useful or valuable?
Your answer
How would you improve this professional development?
Your answer
Would you recommend others to attend this professional development in the future? Explain.
Your answer
Submit
Clear form
Never submit passwords through Google Forms.
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Language	English	Publication Type	e-Journal

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NEW WORK DETAILS

Title	Understanding Western Pacific Teachers' Perceptions and Experiences Implementing Technology in the Classroom	Institution name	Walden University
		Expected presentation date	2022-12-31
Instructor name	Dr. Debra Tyrrell (Project Study Chairperson)		

ADDITIONAL DETAILS

Order reference number	N/A	**The requesting person / organization to appear on the license**	Roque Indalecio/Walden University

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Title, description or numeric reference of the portion(s)	User Acceptance of Computer Technology: A Comparison of Two Theoretical Model	**Title of the article/chapter the portion is from**	N/A
Editor of portion(s)	N/A	**Author of portion(s)**	Institute for Operations Research and the Management Sciences.
Volume of serial or monograph	N/A	**Issue, if republishing an article from a serial**	Volume 35 no. 8
Page or page range of portion	Page 985 Figure 2	**Publication date of portion**	1989-08-31

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