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DISCOVERING THE IMPORTANCE OF ENGAGEMENT IN A VIRTUAL LEARNING  
EXPERIENCE FOR K-12 EDUCATORS

By

KRISTEN ANN CONDELLA

A doctoral dissertation submitted to the  
College of Education  
in partial fulfillment of the requirements  
for the degree Doctor of Education  
in Organizational Leadership

Southeastern University  
September, 2021

DISCOVERING THE IMPORTANCE OF ENGAGEMENT IN A VIRTUAL LEARNING  
EXPERIENCE FOR K-12 EDUCATORS

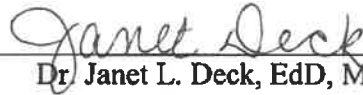
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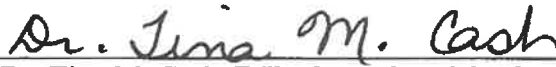
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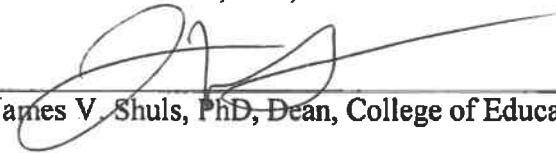
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## DEDICATION

This study is dedicated to all the educators who worked tirelessly to maintain a sense of normalcy throughout a worldwide pandemic. Educators around the globe transitioned, pivoted, and learned new ways to deliver knowledge in creative and unprecedented ways.

## ACKNOWLEDGMENTS

I would like to acknowledge all the professors at Southeastern University and specifically Dr. Sarah Yates for pushing me through the dissertation process when sometimes it seemed impossible. Thank you to my family and friends for supporting me through this process and listening to each chapter word by word more times than I can imagine.

## ABSTRACT

The purpose of this qualitative case study was to discover how a virtual learning opportunity using various digital tools influenced professional development for teachers in a rural school district. The qualitative study was conducted through virtual interviews and participant lesson plan submissions and was aligned with the Technology Integration Matrix. The case study included participation in a virtual professional learning opportunity for K-12 educators on the topic of digital tool use, with an interview at completion focusing on engagement and implementation of learned tools as a result of the virtual learning experience. Participant submission of lesson plans were reviewed to determine perceived implementation of technology in a K-12 classroom because of the virtual professional learning.

*Keywords:* Engagement; professional development; adult professional learning; virtual learning; digital classrooms; COVID-19; Technology Integration Matrix; implementation; digital tools

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## I. INTRODUCTION

This dissertation was a qualitative study of a rural school district's challenges with implementing virtual professional learning opportunities due to the 2020 world pandemic COVID-19. The research shows how digital tools presented in virtual learning opportunities for educators in a rural school district provided appropriate and engaging professional learning opportunities. The study focused on the challenge of providing engaging professional development in a virtual format to implement meaningful, sustained professional development. The school district considered in the study spans 106 miles, serves under 8,500 students, and employs 523 certified teachers and 36 administrators. The school district historically provided school-based professional development opportunities through faculty meetings and professional learning communities. Previous professional learning opportunities were at the district level through a one-day, in-person training in a central location. Because the district did not have a professional learning department, professional development curation and deployment are the district-based teaching and learning department's responsibilities.

### **Background**

For rural communities, distance and time are deciding factors when planning professional learning opportunities. Reardon and Brooks (2008) examined the challenges of professional learning opportunities in rural communities and found that, specific to education, computer-based training alone was not producing effective teachers. Reardon and Brooks (2008) suggested using Senge's (1990) principles of organizational learning to strengthen an organization by using teachers within the organization to provide learning opportunities and provide a forum for teachers to collaborate in the same setting. Chris Bryan (2011) completed a case study in South

Africa focused on rural teachers' professional learning. Initial survey responses suggested that educators in South Africa had limited professional development opportunities with low participation rates before the study. Bryan's (2011) study on professional development in rural areas determined that, when professional learning contained an in-person component, the researchers observed a positive impact on implementation. Also, professional learning in the rural community highlighted opportunities for reflection by teachers on areas for improvement. Reflections using data and peer review techniques were not previously a concern to the teachers.

The Oklahoma Rural Schools Research Alliance (2017) found that, although teachers in rural schools could attend district professional learning opportunities, the support and peer collaboration within the rural schools was less frequent than in non-rural schools. Croft et al. (2015) shared the importance of building a collaborative learning community when enrolled in a distance-learning course or training and emphasized building a community around the idea of face-to-face interaction. In a blended format, participants collaborated in both online and in-person formats with the intent of forming a stronger community for interaction, implementation, and reflection. Also, Darling-Hammond et al. (2017) emphasized the importance of providing "adequate time to learn, practice, implement, and reflect upon new strategies" (p. 36) within a professional learning experience. In consideration of the findings of the Oklahoma Rural Schools Research Alliance (2017) regarding the importance of peer collaboration as a result of professional learning experiences and the emphasis of Croft et al.'s (2015) building community, blended and virtual learning opportunities provided both community and collaboration in the area of professional learning.

According to DeGeorge-Walker and Keeffe (2010), blended and virtual learning used in adult learning "can, in part, be attributed to the interactive capabilities of online communication

technologies" (p. 3). A case study at the University of Central Florida on the impact of digital learning (DeGeorge & Keefe, 2010) produced data-rich examples of engagement and self-learning within a virtual environment. The study emphasized the need for additional research on the topic. The University of Central Florida, a pioneer in digital learning, provided insight into the challenges of scaling virtual learning beyond higher education into the area of professional learning and indicated that training and support for facilitators must be available to ensure positive interaction and learning experiences in all settings (Moskal et al., 2013).

The study conducted at the University of Central Florida (George & Keefe, 2010) on the impact of digital learning found that digital engagement techniques combined with professional learning best practices for adult learners produced positive outcomes regarding knowledge implementation. Web-based tools curated an online environment of content and provided the end-user with various display and manipulation opportunities to review and build upon data. When presented effectively, tools such as video and interactive digital interfaces "are compelling invitations to become personally invested in learning" (Tipton & Tieman, 1993, p. 57). Tipton and Tieman (1993) also found that collaborating among peers in an adult learning format is an essential aspect of engagement in a professional learning community.

Bin-Jomman et al. (2018) conducted a similar study that measured digital tools' implementation in a professional learning environment. The researchers found a statistically significant increase in attention, relevance, confidence, and overall satisfaction with the professional learning opportunity delivery model when professional development was delivered using Web 2.0 tools. Stacey et al. (2004) emphasized virtual learning challenges for the adult learner who did not engage in discussion groups or collaborative settings in the discussion

formats. Adult learners who did not engage in the online discussion format did not find value in the content and could not find the connection between the content and application.

Virtual learning provides the opportunity to combine collaborative experiences and interaction with content presented in a flexible setting. Berry (2015) stressed the impact technology has on collaborative opportunities through discussions and live feeds. These presentation methods provided access and accountability for participants beyond the in-person training session. Meaningful professional development must be sustainable and reflective. A community of practice should be established in an environment to transfer learning from professional development to the classroom and discuss the successes and challenges of implementing ideas or practices (Stacey et al., 2004). Technology provides educators with opportunities to reflect and engage in conversation with others, contributing to teachers' development and their participation in professional development offerings (Rodesiler, 2017).

### **Conceptual Framework**

For educators, professional learning is more than a requirement to maintain licensure. Professional learning is an opportunity to grow and learn up-to-date best teaching practices and applications. Maslow's self-actualization theory (Maslow, 1943) explained individuals' desires to learn more and grow as individuals, either personally or professionally. Professional development in education provides opportunities for educators to learn and grow specific to their professional's needs. The rise of digital learning opportunities has helped provide choices in the delivery method of professional learning opportunities. Maslow's self-actualization theory (Maslow, 1943) emphasizes the importance of having options and making good choices. Based on the theory of self-actualization, researchers at the Chinese University of Hong Kong (2016) investigated the impact of motivation and self-actualization theory based on the number of

courses, duration of the training, and the training's adequacy provided. Overall, the study (University of Hong Kong, 2016) found that training adequacy significantly influenced self-actualization and engagement ( $z = .322, p < .001$ ). Digital learning provides learners with greater choices for a delivery model that can best suit personalized professional growth.

In educational settings, the adult learner gains knowledge through professional learning opportunities provided by vendors or universities. Digital learning offers new opportunities for rural communities to learn for pleasure, certification, or degree-seeking purposes. On a large scale, one in six college or university students is currently enrolled in an online or digital learning environment (Lederman, 2018, p. 47). In contrast to enrollment, the drop rate for online courses is 50% higher than face-to-face courses. Participants cited lack of engagement as the reason for dropping online courses in both university and continuing education courses (Greenagel, 2014 p. 26).

Johnson et al. (2018) discussed the importance of engagement in learning digital learning environments for K-12 classrooms and adult learning scenarios. The engagement theory's basic principles are to allow for group context or collaborative teams, to be project-based, and have an authentic focus (2018). Through an interactive, virtual, and professional learning model, participants can collaborate and participate in project-based learning applications with global participants. Participants in virtual professional learning also have opportunities for authentic discussion and reflection on implementing knowledge and activities within the workforce. When professional development participants are not engaged, teachers may not implement strategies and, therefore, diminish the benefit of an online learning opportunity. As engagement is cited as a reason for dropping an online course, designing professional learning opportunities in a format with engagement at the forefront is essential.

### **Significance of the Study**

For educators in the United States, distance learning is not a new concept. According to the Center for Digital Education (2018), 29.4% of students in a masters-level educational leadership program have completed at least one course online. Introducing digital learning to adult learners in a non-degree seeking environment and using digital tools as a means for professional learning provide increased access and opportunity for educators pursuing additional knowledge in education. The virtual format allows the content to be tailored to a specific school district's needs and provides collaborative opportunities with educators who face similar challenges and situations within the district (DeGeorge-Walker & Keefe, 2010). Between 2012 and 2017, technology and learning management systems' availability to deliver instruction in higher education course offerings increased 7% (Lederman, 2018, p. 47).

The COVID-19 pandemic prohibited schools from providing face-to-face instruction for students from Pre-School to Higher Education. Due to forced physical school closures, Florida shifted to online availability for all students (FLDOE, 2020). The increased use of instructional technology and learning management systems included over 2.7 million K-12 students and 350,000 higher education students. The COVID-19 pandemic did not only limit face-to-face opportunities for students but also for over 65,000 teachers and staff in K-12. Professional development requirements in Florida for K-12 teachers (FLDOE, 2020) and the sudden shift to school closures within 14 days' notice warranted focused professional learning in the area of distance learning and technology.

Building upon existing research on the subjects of digital learning and effective professional learning attributes for educators, this study will focus on a virtual learning format as



a delivery method for rural educators' professional development. The virtual learning format provided a digital component to address the constraints of a rural educator's location through an online platform that can be accessed wherever the Internet is available. Learning formats, which provide a collaborative platform encouraging engagement and accountability, can be sustained over multiple interactions and presentations of information while also allowing for learning, practice, implementation, and reflection (Rodesiler, 2017).

The Coronavirus pandemic of 2020 created a new environment for educators in a K-12 setting. In Florida and across the United States, all public schools were ordered to be closed for face-to-face interaction as of March 13, 2020, and were unable to reopen in an on-campus setting until August of 2020 (Florida Department of Education, 2020). The rapid shift in students' learning environment also creates the urgency to create a digital learning format for educators. The pandemic created an urgency for teachers to be trained in digital delivery techniques as well. Unable to meet face-to-face due to the State of Florida order (2020), teachers participated in digital learning activities for professional development. Access to digital tools created the opportunity for all districts, rural and urban, to deliver professional learning to support various district needs without endangering participants by meeting in a face-to-face environment.

### **Purpose Statement**

The purpose of this qualitative case study was to discover how a virtual learning opportunity using various digital tools influenced professional development for teachers in a rural school district. Virtual learning is defined as learning in a virtual setting with collaborative technology. The virtual learning opportunity was bound through a one-month virtual learning environment for 30 educators. The content delivered through the virtual learning model was focused on training educators on technology integration in a K-12 classroom.

## **Overview of Methodology**

The methodology used to discover the influence of virtual professional development opportunities was qualitative and completed using a case study within a rural school district of 585 educators. Documentation of the curation, marketing, delivery, collaboration, and educator implementation of the virtual learning professional development opportunity occurred through interviews and archival document submission. The study was conducted over 30 days within a virtual learning environment. The professional development was delivered via a learning management system and video conferencing platforms. Access to the professional learning opportunity was requested from a rural school district in Florida. Participants included rural school district educators who agreed to participate in the study and the virtual learning opportunity. Data was collected through an interview conducted after the asynchronous activity in the virtual learning format, which ended the professional learning course. Data collection concluded with archival documents of educators' lesson plans demonstrating the implementation of content integration. Archival documents were submitted in a virtual environment through electronic submissions. The Technology Integration Matrix (Florida Center for Instructional Technology, n.d.) was used as a rubric to determine implementation quality and effectiveness based on the lesson plans.

The role of the researcher was to curate the virtual learning opportunity and complete interviews of participants. All data were managed using a learning management system to prevent researcher bias and to prevent the instructor from removing data collected. Also, a third party presented the professional learning activity to avoid researcher or volunteer bias. All lesson plan archival documents will be evaluated using the Technology Integration Matrix (Winkleman,

2020) and calibrated through comparative archival document data from other school district members using the same matrix indicators.

### **Research Design**

The course took place over 30 days. The digital course on integrating technology in a K-12 setting was published using the Canvas Learning Management System and launched on the first day of the training experience. The course was comprised of a two-hour synchronous session using a video conferencing platform. An additional hour was provided for semi-synchronous support during the assignment of collaborative activities for participants. Finally, each week a 30-minute activity was assigned to each participant with the option for each educator to participate in a semi-synchronous session for support or complete the activity asynchronously.

Sixty educators voluntarily enrolled in the Use of Digital Tools professional learning opportunity. Participants were selected using a convenience sample based on voluntary enrollment in the professional learning opportunity and their availability to participate in the two interview sessions in addition to the professional learning opportunity. Of the enrolled participants, 20 participants were interviewed using a convenience sample for interviews and lesson plan submission. Participants were K-12 educators, had between one and twenty-five years of teaching experience, and ranged in age from 24-65. The range in age and experience allowed data to be collected using metrics specifically related to age and experience. Selected participants were interviewed using Microsoft Teams video conferencing tool after the close of the synchronous and semi-synchronous sessions (Appendix A). Interview data were analyzed to determine the virtual professional learning course's influence on lesson planning and technology use. Participants submitted up to three lesson plans within 20 days of completion of the first asynchronous session. Using the Technology Integration Matrix (Winkelman, 2021, selected

participants' lesson plans were analyzed to determine the implementation of the digital tools content provided in the virtual delivery model.

### **Research Questions**

This qualitative research study discovered how virtual learning influenced a professional development opportunity on the implementation of technology for teachers in a rural school district with a focus on the following research questions:

1. What influence does the use of various digital tools have on the perceived effectiveness of professional development?
2. What are the perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development?

### **Data Collection**

Data was collected through participant interviews and teacher lesson plan archival document data as measured by the Technology Integration Matrix (Florida Center for Instructional Technology, 2021). Active participation in the virtual learning model was monitored through the Canvas Learning Management System and by the course facilitator, who observed logins and submissions. Collaboration, defined as posting initial discussion responses and replying to at least two other participants in the course, was considered active participation in online discussions. Interviews of selected participants were completed after the final semi-synchronous learning opportunity after the course. Course interview questions were used to discover the influence of various digital tools on the perceived effectiveness of professional learning and teachers' perceptions of virtual learning opportunities for professional development in a rural school district.

The lesson plan archival documents were used to determine the influence of digital tools in the implementation of reflective teaching practices through the Technology Integration Matrix (Winkleman, 2021).

### **Procedures**

The virtual learning opportunity took place in a digital format over a period of 30 days in conjunction with an initial 2-hour virtual opportunity provided via video conferencing. Open enrollment for professional development was promoted via digital communications within the school district, internal email communications, and social media. Participants volunteered to enroll in the professional development course and participate in an interview and to submit three lesson plans for analysis.

Participants in the study engaged in the initial virtual learning component, a two-hour synchronous virtual learning session using the Canvas Learning Management System. The virtual course documents became available to participants during the initial virtual learning component. Participants then completed a one-hour asynchronous session to complete activities as assigned. The asynchronous learning session included one required discussion with discourse among participants; one assignment utilizing a video, article, or task to be submitted; and virtual collaboration using breakout rooms. The study participants then had the opportunity to participate in additional semi-synchronous learning activities on digital technology for the next 30 days at an interval of one session per week, for a total of four opportunities. Participants in the study were interviewed after the course (Appendix A) and submitted three lesson plans for review based on the Technology Integration Matrix (2021).

## **Limitations**

The study conducted had limitations. The distance between educators and the participant's pre-conceived notions regarding professional development within the profession contributed to the study's limitations. The study was conducted in a small, rural district, limiting the pool of available participants to the school district employees, which is limited to 523 per the school district demographics website (2019). Participation was requested voluntarily, which provided a limitation on the participants' views on professional development and voluntary involvement in a virtual learning professional development opportunity. Even though the school district spans 106 miles from school one to school ten, the virtual nature of the training led to no geographic constraints being noted. Due to the training's virtual nature, no geographic constraints were noted as limitations during this study.

Also, participants had a varied skill level in the use of learning management systems and technology. The ability to utilize the technology presented within the learning environment became a limitation regarding course participation. The Bill and Melinda Gates Foundation (2014) found that only 29% of teachers surveyed are satisfied with the current professional development format. Statistics such as this may provide a pre-conceived notion of the value of professional learning before enrollment. Finally, the study context was a professional development opportunity that used virtual learning to train teachers in technology implementation. The information learned in this case study might not be generalizable to other virtual learning opportunities for professional development.

## **Definition of Key Terms**

Teaching and Learning Department: a district-wide team of content area experts who work with district leadership to provide support and training in specific areas. Members are typically

involved in the professional learning process based on the content area and determine the school district's support needs and individual school-based data (Ann, D., & University of Lethbridge, 1999).

**Blended Professional Learning:** blended learning is any formal education program in which a student learns at least in part through online learning, and at least one interaction takes place in a face-to-face context with some element of student control over time, place, path, and pace (Maxwell, 2016)

**Technology Integration Matrix:** a tool developed to determine the impact of technology tools in the classroom environment. Used in Florida districts, the Technology Integration Matrix provides levels of use and integration of technology into content lesson plans and classrooms. See Appendix B (Florida Center for Instructional Technology, 2021).

**Learning Management System:** An open, extensible learning ecosystem that provides a platform to house content and delivers in a virtual environment. Examples include Canvas, Moodle, and Blackboard (Instructure, 2019).

**Virtual engagement** – using various forms of online communication to become involved in a civic or educational movement (Virtual Engagement, 2019).

### **Summary**

Professional learning opportunities are crucial in any successful school district, regardless of size or geographical constraints (Darling-Hammond et al., 2017). The case study's intended outcome was to determine how the facilitation of virtual learning through digital tools influences a professional development opportunity for teachers in a rural school district. The virtual professional development model sought to provide an opportunity for educators to participate and engage with peers through a digital environment to build a collaborative learning community

(Croft, Dalton, & Grant, 2015). The study also references how virtual learning opportunities for educators in a rural school district with limited staffing resources may provide relevant professional learning opportunities.



## II. REVIEW OF LITERATURE

Studies have tried to measure how virtual learning opportunities using digital tools influenced professional development for teachers. With educators' needs at the forefront of the study, a review of teacher perceptions of professional learning and indicated needs are discussed. Immediate access to professional development in relation to a pandemic and Maslow's (1943) theory of human motivation drove the need for professional learning in an on-demand and open access format. Multiple virtual learning formats exist including facilitated learning, Massive Online Open Courses (MOOC), learning object repositories, and social media. Each of these various delivery models of professional learning content was reviewed to discover the importance of both hardware and software programs to increase engagement in a virtual delivery setting. Reviews of access and equity through the lens of rural school districts and the availability of meaningful professional learning for all educators are also necessary to discover the possible value of access to virtual learning opportunities in rural communities.

### **Professional Learning Needs and Perceptions**

The content of professional development and the ability to collaborate during professional development opportunities are foundational in creating effective professional development opportunities. As presented at the 14th Annual Multidisciplinary Academic Conference in 2019, Chesnokova and Agavelyan discussed professional development's changing

context. Practical professional development factors included providing tools to revitalize an educator's professional practice and prepare for an evolving educational environment (Chesnokova & Agavelyan, 2019). By restructuring the professional learning process, professional development can meet the needs of a global market of educators. Personalization of an educator's learning to meet individual needs related to job duties in education provides interest and opportunities to select relevant content as it applies to individual job duties (Chesnokova & Agavelyan, 2019).

In a 2017 study of educators' professional development needs, Matherson and Windle learned that teachers were interested in relevant and engaging educational opportunities. Matherson and Windle (2017) reviewed professional development delivery models in educational settings. The researchers surveyed 250 teachers from the United States and Canada. The survey asked participants if content was more engaging and applicable when presented in a lecture setting or an interactive setting. Participants responded in open text response that direct instruction, lack of collaboration, and implementable action were not sufficient for future implementation. One participant stated, "Professional development must transform from the sit and get to engaging, sustainable delivery methods" (Matherson & Windle, 2017, p. 31). Continued support was also rated as a highly essential change needed in professional learning in the survey. Matherson and Windle (2017) concluded that professional development should provide an engaging format related to teacher needs and content requirements. However, a question for consideration was whether the most effective delivery method was face-to-face or digital.

Molnar et al.'s (2002) analysis of research noted a theme throughout the reviewed studies in the last 20 years in which relevance, collaboration, and opportunities to share with a broader

audience ranked as essential attributes of meaningful professional learning. The Bill and Melinda Gates Foundation (2014) conducted a survey focused on sustainability and interactivity as critical factors in meaningful professional development. The Bill and Melinda Gates Foundation identified that “the ideal professional learning experience should focus less on presentations and lectures and more on opportunities to apply techniques through demonstrations or modeling and practice” (p. 4).

The Bill and Melinda Gates Foundation's (2014) study noted that professional learning delivery also must meet participants' needs and availability to participate in professional development. Teachers were satisfied with extended length of courses lasting over a period exceeding one day over intervals of time and conferences. The educators were dissatisfied with workshops because the workshops and intensive summer training did not provide sustainable professional learning with a continued opportunity to collaborate with peers or refer to an expert in the field after the initial training. Intensive summer training contained no follow-up after the initial presentation, self-guided professional development, or related professional learning communities. In self-guided professional development and professional learning communities, teachers indicated that an expert did not exist in the training module, or they were learning from each other with no confirmation of “accuracy or expectation” (Bill and Melinda Gates Foundation, 2014, p. 3). The participants shared the need for meaningful professional learning and dissatisfaction with current professional learning opportunities.

Teachers’ perceptions of professional learning may differ when professional development participation is not of a voluntary nature. Parsons et al. (2019) distributed a survey on teacher perceptions of professional learning. The survey was distributed via social media and through professional contacts for voluntary participation. The survey allowed all volunteers'

participation, with the only parameters being that the participants were teachers as validated by a school district email address. Two hundred fifty-eight participants completed the survey, and participants represented each state in the United States. Eighty-four percent of the respondents indicated that they were elementary school teachers, and 41% indicated they had less than 10 years of teaching experience (Parsons et al., 2019).

The survey addressed the reasons behind teacher participation in professional learning, the topics of available professional learning, and teacher perceptions of different approaches to online professional development. Parsons et al.'s (2019) research indicated a moderate negative effect size ( $d = 0.50$ ) between mandatory professional learning opportunities and a teacher's perceived benefit from participation ( $M = 3.18$ ,  $SD = 0.93$ ), ( $t(182) = 3.34$ ,  $p < .003$ ). The researchers also asked participants to rank the potential benefits of online professional learning, and 90.9% of participants indicated that anytime access was critical. Conversely, only 27.3% of participants indicated creating connections with people outside of the geographical area as extremely important (Parsons et al., 2019).

Parsons et al.'s (2019) national study indicated that over 70% of participants had participated in an online professional learning opportunity, and 36% of respondents indicated an ability to apply learning from an online environment to current job roles, regardless of voluntary participation (Parsons et al., 2019). The researchers noted a limitation of self-reporting by participants. Each participant may have participated in various online professional learning opportunities. The validity of each response provided from participants as adjusted for volunteer bias was not within the study's confines. The researchers suggested future research may include creating a controlled professional learning opportunity to determine the opportunity for potential benefit to teachers.

Nolan and Molla (2019) indicated the need to evaluate the format and focus of professional learning. As part of certification requirements in each state, teachers continue to participate in professional learning opportunities for growth and expertise in content, reflect on the practice of teaching, and share thoughts with colleagues. The researchers interviewed 25 early childhood educators in a face-to-face format, selecting participants based on demographics, access, and willingness to participate in professional growth opportunities. The study results indicated educators preferred professional development with access to a face-to-face component in professional development opportunities relevant to job duty, knowledge acquisition, and teaching ability (Nolan & Molla, 2019). Teachers in the study also indicated that collaboration with colleagues provided an outlet for sharing ideas and building a community to improve upon concepts and strategies (Nolan & Molla, 2019). Limitations to the study included participant selection, as participants were bound by attendance at face-to-face interaction. The face-to-face interaction limited available participation by additional participants due to scheduling conflicts.

Gunter and Reeves (2017) completed a mixed-methods study of the impact on teachers' attitudes towards professional learning when a mobile device was the primary means for content delivery. The study began with 171 participants who volunteered for an 8-week online course on teaching technology. The study's focus was directed to teachers' attitudes towards mobile devices, and the study investigated the ability to deliver on-demand learning using devices. The researchers surveyed teachers' opinions on the likelihood of using a mobile device in the classroom for instructional purposes after receiving professional development on the use of technology in a professional learning experience. Participants completed a survey focused on attitudes towards mobile learning, perceived learning, and perceived engagement. The participants filled out the survey before the professional learning and after attending the

professional learning. The goal of the pre- and post-surveys was to determine teachers' opinions concerning the value of mobile learning and the incorporation of mobile learning into the curriculum (Gunter & Reeves, 2017).

After an initial 32 participants dropped out due to lack of access to a mobile device or personal reasons, the resulting study included 139 teachers from grades pre-kindergarten to grade 12. Each survey ( $n = 91$ ) contained a series of Likert scale questions and five open-ended questions. The researchers analyzed the Likert scale data. The results indicated that the post-test provided more favorable responses towards professional learning than the pre-test ( $z = -4.86, p < .001$ ), showing a positive engagement and attitude towards technology use due to the course. Using the open-ended questions as a qualitative response, Gunter and Reeves (2017) discovered that the emerging themes included self-efficacy, confidence, opportunities for parental involvement, and teacher empowerment. The use of a mobile device for a professional learning opportunity provided users with a portable, on-demand device to receive professional learning and provided the teacher with the opportunity to use a mobile device for receipt of information just as a student would (2017). One participant indicated, "Mobile technologies will be as common in our professional development as a textbook has been to classrooms for the last 200 years" (Gunter & Reeves, 2017, p. 1316).

The relationship between teacher attitudes towards engagement in professional learning and on-demand technology to deliver the information can prepare future professional learning models. Although the study conducted by Gunter and Reeves (2017) focused specifically on the use of a mobile device, the study provided initial data to continue research to discover if the device, the content, or the delivery method (on-demand) had the most influence on a teacher's attitudes towards professional learning delivery and application.

Postholm (2018) conducted a meta-analysis related to professional development in education from 2016 and 2017 to understand what professional development looked like and what impact professional learning had on student achievement. In Postholm's (2018) meta-analysis related to professional learning, the theme of professional learning communities and guiding materials was present. In the analysis, Postholm (2018) concluded providing professional learning that did not offer outside input from experts or research was insufficient to influence the learning process and student achievement.

Construction of the professional learning communities in Horn et al.'s (2017) study was based on summative outcome data from students' math and reading state test scores from the previous year. Forty percent of face-to-face teacher professional learning meetings were for logistical support and day-to-day operational management and limited the time for discussion about the content and instructional delivery practices. The school-based administration required intervention planning based on test scores but limited the teachers' available time for professional learning discussions. In Horn et al.'s (2017) qualitative study reviewing teacher workgroups, Horn et al. (2017) found teachers expressed a need to facilitate discussion amongst colleagues for professional reflection and refinement of implementation. However, teachers rarely participated in collective conversations in a face-to-face environment outside of daily work interactions. Workgroup conversations regarding the content or instructional practice were limited to interactions in the school setting due to the immediate need for logistical and student behavioral interventions or solutions. The discussion within professional learning communities was limited to data collection—not growth—and professional discussion of strategies (Horn et al., 2017). A limitation to the study on collaborative professional learning was the construction

of groups based on student data analysis for behavior and academic intervention concerns, not out of teacher interest or need (Horn et al., 2017).

### Virtual Learning Needs during a Pandemic

Coronavirus (COVID-19), a pandemic event beginning in 2019, caused state and national school closures and a shift to virtual learning in many areas. The impact of the closure of face-to-face learning is under research. Nathaniel Gyimah (2020) completed a study on assessing technology innovation in education during the Coronavirus pandemic. The study took a global review of over 94% of the world's schools' immediate closures beginning in March of 2020 (Gyimah, 2020). As schools closed, 1.58 billion students worldwide were thrust into a digital learning environment (Gyimah, 2020). Gyimah's (2020) review of data found that, in countries that took a proactive approach to distance learning, such as Argentina, a collaborative of professional organizations created immediately deliverable professional learning modules to support educators in a virtual learning environment. Gyimah (2020) also found that the greatest gaps in providing a virtual learning environment for teachers and students were in areas with limited access to Wi-Fi or digital tools. Although Gyimah's (2020) research is preliminary, one recommendation from the research did indicate that "adequate training and workshops should be organized to educate students and teachers on the usage of E-learning" (p. 5).

Digital tool providers supported schools' transition to a 100% virtual learning platform in education for instruction. For example, Microsoft Corporation offered premium versions of Teams for six months, and Google provided free Enterprise for Education editions of web-based software for all K-12 institutions due to the COVID-19 pandemic (Basilaida & Kvavadze, 2020). When technology corporations assisted in lifting the barrier of access to web-based digital tools because of school and business closures, technology became an option for many school districts,



including 61 of the 67 Florida school districts. The other six districts were limited to paper packet productions due to limited access and Wi-Fi availability. Besides access to digital tools for students and teachers, digital tool availability provided additional support to parents assisting students and teachers in the learning process. Digital tools also evolved during the Coronavirus pandemic. As school systems and teachers began using the digital tool platforms for student use and professional learning, the conversation about professional learning needs changed from teaching practice in the physical classroom to digital tools to support collaboration and engagement. As a result, major corporations such as Google adjusted various platforms such as Google Meets to create mute all buttons and waiting rooms for participation (Basilaida & Kvavadze, 2020). The changes in digital tools to meet the changing digital environment's needs are examples of how virtual learning has a quick turnaround to support participants' needs, whether in a K-12 or adult learning organization. Basilaida and Kvavadze (2020) echoed the research of Gyimah (2020), stating that, although corporations provided access to digital tools for learning, the limitations of access to Wi-Fi and the internet were the greatest barrier in the implementation of a digital learning environment.

### **Conceptual Framework**

In Abraham Maslow's "A Theory of Human Motivation", published in *Psychological Review* in 1943, Maslow discusses the hierarchy of human needs, including self-actualization. A person becomes discontent and restless if the individual is not creating, learning, or becoming what he is destined to do (p. 383). In 1983, Kennard completed a study of the relationship between self-actualization and job satisfaction in teaching. Participants included 615 teachers from all grade levels across Michigan. Kennard reviewed teachers' perceptions of self-actualization and happiness. The researcher found that teachers who rated themselves higher in

self-actualization levels were more satisfied with the field of teaching ( $r = .61, \alpha < .05$ ). Kennard (1983) suggested that school districts use the survey results to increase self-actualization and improve teacher satisfaction through enhanced training methods. The research date and applicability limited Kennard's (1983) study to the teaching environment, but the research addressed the relationship between learning opportunities and teacher satisfaction.

Kearsley and Schneiderman (1998) analyzed engagement based on technology and teaching. If learners meaningfully engage through interactions with others and tasks, learners find the application of the learned content. Gunter and Reeves (2017) completed a second mixed-methods study based on Kearsley and Schneiderman's (1998) study and focused on teachers' attitudes, engagement, and dispositions during professional learning. The study consisted of 25 participants who were given a digital survey using a Likert scale at both the start and finish of an 8-week course conducted both in-person and online. The survey consisted of 25 Likert scale questions and five open-ended response questions to provide qualitative data. Gunter and Reeves (2017) determined that a participant's perceived engagement increased as the blended course continued ( $z = -4.71, p < .001$ ). The qualitative data collected by Gunter and Reeves (2017) revealed themes of teacher empowerment, self-efficacy, and confidence. One teacher described the training opportunity in the open-ended response as "Engaging, game-changing, inspiring, increased awareness, inspiring, empowering. I was truly intimidated by technology- now I dive right into figuring out what to do" (p. 1312).

Both the Bill and Melinda Gates Foundation's (2014) study and Postholm's (2018) study noted a lack of engagement by participants in professional learning opportunities. Gunter and Reeves (2017) suggested the use of technology to support greater engagement to enhance learning. Participants should be actively collaborating with technology tools when not in a face-

to-face environment. Professional learning attendees should continue the conversation through online chats in a greater audience to enhance different points of view and expertise (Gunter & Reeves, 2017).

Professional learning participants can also display engagement through project-oriented learning and an authentic focus. Gronseth and Hutchins (2019) studied the flexibility in learning with technology. The researchers focused on Universal Design for Learning and the use of multiple means of engagement as a principle for online learning and increased motivation and participation. In a survey of 89 adult learners, Gronseth and Hutchins found that 100% of participants used digital tools to support learning transfer to application. The use of online collaborative tools was the preferred medium for helping individuals transfer and apply learning. Increased use of technology, such as web-conferencing and discussion boards, created a sense of personal ownership in content creation and engagement for learning (Gronseth & Hutchins, 2019).

### **Selection of Technology for Delivery of Professional Learning**

The use of technology for educators in professional learning experiences has grown due to technology available in the educational setting (Bernstein, 2019). The recent availability of digital devices in the educational market has caused large companies such as Google and Microsoft to create education divisions to keep up with the growing technology movement in the educational market across the world (Bernstein, 2019). Bernstein's 2019 survey of technology available in schools included over 20,000 teachers and students from 100 countries. The study indicated 48% of students use devices in the classroom daily, 90% of students have access to technology while at school, and 95% of teachers have access to portable technology such as a laptop both in and out of the classroom, 24 hours a day (Bernstein, 2019). With the availability

of electronic devices for both teachers and students, the device becomes a vehicle through which direct and explicit instruction is delivered in multiple formats for both teachers and students (Bernstein, 2019). Bernstein concluded the report with the indication that the use of technology in education is an expectation, and “learners rely on technology to add value to and enhance learning” (p. 2).

The growing demand to provide every learner with constant technology made the educational setting very competitive for educational technology software and hardware companies (Thornburg, 2014). Technology that adapts and gamifies instructional content is released each month in the educational technology market. Each tool and software choice must be reviewed for content, appropriateness, and intended outcomes (Thornburg, 2014). In addition to selecting the device, digital tools within the learning experience brought forth a growing opportunity for learners to expand access to the material (Borba et al., 2016).

Three initial purposes for technology in learning exist: (a) as a tutor for simulations or practice, (b) as a word processing tool, or (c) as a device that learns from the user to provide adaptive content (Thornburg, 2014). Regardless of technology improvements, simulations, word processing, and programming, devices are the foundation of technology in both the classroom and the professional learning environment.

#### Hardware Selection

When a school district or school considers device selection for staff and students, the device's learning outcome and purpose are the primary indicators of purchase. Devices selected by the school or district should include both classroom and collaborative tools to assist both in the acts of teaching and learning from others (Catalano, 2015). The devices available can include a tablet, providing touch screen capabilities and limited applications by download; a web-based operating system, providing access to all cloud-based applications and internet access; and an all-

in-one computer, providing all the above with a downloadable operating system for integration with external applications and software (Burt & Johnston, 2020). A project-based learning approach supports using these technology tools to facilitate in-depth exploration, problem-solving, and real-world skills (Schafer, 2020). According to Schafer (2020), device selection should include a focus on project-based learning outcomes. The selected device should enhance the learner's voice and choice when providing solutions to problems in a project-based learning inquiry model (Schafer, 2020).

#### Digital Tool Selection

The three utilizations for the use of technology, (a) as a tutor for simulations or practice, (b) as a word processing tool, or (c) as a device that learns from the user to provide adaptive content (Thornburg, 2014), are essential to note when implementing best practices. Brown et al. (2017) made recommendations on behalf of the Technology and Engineering Association to utilize technology through multiple modalities and delivery methods. Engaging connections to previous knowledge, promoting higher-order thinking, and engaging the learner through collaborative approaches are factors in using technology in the learning process.

Hunt-Barron et al. (2015) studied digital tools for strengthening professional learning experiences for educators. The researchers focused on the digital tools used for participant feedback and collaboration. The digital tools used were Google Sites and a live blog with teacher contribution opportunities. The Google Site housed the academic blog containing professional development articles and practices, and the comment section was intended to facilitate collaboration and feedback from participants. Hunt-Barron et al. (2015) collected survey data from 35 teachers on perceptions of the use of Google Sites as a digital tool for supporting teachers from a distance. The participants were selected randomly from three separate

professional learning events. Each of the professional learning events was identical in content and construction, with the single independent variable being district location.

Hunt-Barron et al. (2015) found that three main obstacles existed when using digital tools and technology as a means for collaboration and participation: time, availability of technology, and public presence. In the full virtual environment, digital tools were used as a means for participation for continued engagement; however, only 27% of the teachers surveyed revisited the blog to connect with other participants. Participants indicated a lack of time to return for continued engagement in the virtual course. The second obstacle, accessibility of digital tools, was a limitation for participants. Although the study included an initial survey of hardware availability, each of the three districts in the study had different digital tool availability. Limitations included blocked website access to Google or unreliable internet connectivity. The final obstacle was the public publishing of individual work as part of the professional learning opportunity. Only 27% of the participating teachers felt comfortable publishing comments or sharing ideas in the web-based setting and many times did not pose questions or comments. The researchers also found that of the 144 participant feedback posts, 54% were of an informative nature and not a collaborative response (Hunt-Barron et al., 2015).

Given the documented limitations of a full virtual professional learning environment such as available technology and lack of personalized commentary, further research is needed to determine if the barriers result from specific digital tools or the full virtual environment. “Discovering ways to make digital spaces accessible, engaging, and valuable for teachers” (Hunt-Barron et al., 2015, p. 12) provides new information for future researchers to continue to find ways to integrate technology to enhance professional learning.

## Micro-credentialing

An additional technology component used in professional learning is the assignment or accrual of badges and micro-credentials upon completing a self-paced professional learning opportunity. Micro-credentials or badges can be added to résumés and professional accounts, and the badges serve to exhibit competencies and understandings (Davies et al., 2015). Brauer et al. (2019) recorded teachers' experiences in a qualitative study's badge-driven learning environment. Seventeen teachers were surveyed six times in a group format. Each survey took place after the completion of a module in the professional learning experience. The focus of the survey included motivation, engagement, and gamification related to professional learning. Questions included topics about the badge's value if the badge served as a motivation for completion and overall enjoyment of the experience. Of the 17 participants, 14 earned badges, and three did not complete the online learning experience. The researchers used the data collected to review the relationships between online learning and group thinking regarding badging and micro-credentials.

The first group survey focused on the participants' experiences related to access to online materials. Brauer et al. (2019) noted the autonomy of progression in access to online materials allowed participants to earn badges related to the acquisition of information efficiently and with minimal support. In the second survey, which focused on online socialization and engagement, Brauer et al. (2019) noted a common theme of limited public socialization and collaboration on the available social media platforms. The findings from Brauer et al.'s (2019) study amplified the results in Hunt-Barron et al.'s (2015) study that participants in online learning opportunities had limited participation in public online discussion forums. The Brauer et al. (2019) and the Hunt-Barron et al. (2015) studies both indicated that research is needed on the availability of online collaboration in a public forum and secured response forums.

Brauer et al.'s (2019) surveys continued focusing on participation related to the receipt of a badge at completion. The researchers found that participants completed all required assignments to earn the badge; however, the participants did not participate in the optional webinars and support sessions if they felt confident completing the assigned task to earn the badge. The failure to participate in the optional support webinar sections exhibited positive self-confidence in the independent learner; however, a lack of discussion forums in the support modules precluded the participants from engaging in an online discussion with other participants for support. The study's final survey (Brauer et al., 2019) was distributed after the modules on knowledge construction and completion. The researchers found participants' overall positive perceptions of digital badging as a record of completion of professional learning created an atmosphere of competition and satisfaction at the conclusion at each stage of the learning experience. The researchers noted the limited sample size of only 17 participants in the study. The researchers indicated that providing a collaborative environment in which discussion was restricted to include only participants in the study was key to a successful online professional learning opportunity.

### **Approaches to Technology Enhanced Professional Learning**

The use of digital tools in both the classroom and in professional development provided flexibility and increased collaboration in learning experiences (James & Figaro-Henry, 2017). However, teachers needed training to incorporate the tools into the classroom. The training should not be limited to tool functionality and should include delivery methods that use technology to increase collaboration and application (Hamdan et al., 2015). Digital tool skills support the virtual instruction model to facilitate video conferencing, communication opportunities, and collaborative workspaces in digital learning.



Educational technology and virtual learning are two of the fastest-growing markets in both the education and technology fields during the last five years (Catalano, 2015). Because of the COVID-19 pandemic, 81% of K-12 students worldwide participated in online learning in 2020 (Li & Lalani, 2020). Digital-only technology now applies to the traditional K-12 school curriculum and asynchronous professional learning opportunities, providing an expansion of learning opportunities for students and academic professionals accelerated most recently due to the COVID-19 pandemic (Li & Lalani, 2020).

Educators who participate in technology-enhanced professional learning programs select a traditional setting with at least one face-to-face session that includes a digital component to be completed asynchronously or enroll in an entirely virtual environment. The integration of technology in both the online and blended settings provides opportunities for individualized course progression for learners worldwide. An examination of digital tools and presentation models blended within a traditional classroom setting increased available course offerings for learners by using the power of digital communication and integration (Borba et al., 2016).

According to Borba et al. (2016), five main areas exist in digital learning:

- learner access in blended learning,
- Massive Online Open Courses (MOOCs),
- Learning resource depository,
- Social networking,
- Supplemental classroom instruction

The five areas were interdependent and served as factors to consider when implementing digital learning tools in delivery models.

## **Blended Model**

In the blended instruction model, facilitators integrate technology into assignments to assist or enhance the learning experience. The students' ability to use technology is not measured as an outcome; outcomes focus on students' mastery of content (Kiryakova, 2019). In the blended course model, course facilitators and instructors guided participants to conduct initial research on a given topic before the lesson using MOOC platforms like Khan Academy. Course facilitators held evening chats with participants using social media or other platforms in a digital environment. When a course facilitator implements structures such as rubrics to pre-define learning objectives and protocols for a response in chats and discussions, participation occurs in synchronous and asynchronous learning environments (Kiryakova, 2019). When technology provides the ability to access content virtually, the classroom or face-to-face learning environment may transform into an environment where the instructor offers active learning or experiential learning for the learner depending on how the technology is implemented. Kiryakova (2019) provided the use of the blended learning model in the area of biology. Using a blended learning model, digital tools, and asynchronous use of technology, the course facilitator or instructor asked the educator to have completed independent reading and review various best practices on delivering cell biology in a classroom. Once the educator participating in a blended learning format experience arrived for the synchronous portion of the learning, the training focused on applying best practices, modeling, and reflection. With technology and a blended model, less face-to-face time was spent on the training's synchronous portion of rote tasks. More time was spent creating productive, cooperative learning environments and providing real-life opportunities (Kiryakova, 2019).

A blended model is also known as a flipped classroom. Although a flipped classroom is a pedagogical approach, a core component of the flipped approach is using technology to view

videos on demand (Bicen & Taspolat, 2019). Flipped classroom methods do not change the explicit or direct instruction but can increase the learners' cooperative and constructive outputs. By expanding the out-of-class video chats and digital study groups, learners can create an authentic and collaborative environment that promotes problem-solving skills (Bicen & Taspolat, 2019).

Boeve et al. (2017) completed a quantitative study on the effectiveness of a flipped-classroom approach on adult learners in a higher education setting, comparing 205 participants enrolled in a flipped-classroom course and 295 participants enrolled in a face-to-face course. The study's purpose was to determine the study habits and application of knowledge in a flipped classroom compared to a traditional classroom of face-to-face-only engagement. The study indicated the asynchronous work was limited to annotation, research, and review of notes, and no formal structures or output products were required from the asynchronous sessions. The study results showed a weak correlation ( $r = .25, \alpha < .05$ ) between the amount of practice and application a participant completed in a flipped classroom compared to a traditional face-to-face classroom. The correlation between content mastery in a given area and participation in a flipped classroom model was also weak ( $r = .25, \alpha < .05$ ). As the course was available on the learner's time, the participant engaged in the classroom experience using technology tools available on the learners' schedule. A common theme in the exit survey of participants in the flipped classroom was "If I didn't understand it, I could always go back and review it again" (Boeve et al., 2017, p. 1025).

### **Facilitated Learning and Massive Open Online Courses**

MOOCs modified the traditional hierarchy of content instruction (Borba et al., 2016). Current K-12 educational structures use a series of classes or grade levels, including prerequisites, for completion. In contrast, MOOCs remove age and prerequisite requirements and

provide access to individuals regardless of geographic location. MOOCs also eliminate financial obligations for exploratory courses and provide open access to socioeconomically diverse populations. Open access offers every learner options for personalized learning or learner interest, despite geographic location or socioeconomic status. MOOCs also provide connectivity to users across a common digital platform as course activities occur in a shared environment (Kiryakova, 2019). Kiryakova (2019) noted that MOOCs included negative aspects, including a lack of direct contact and real-time interaction with participants, as an area of research related to completion rates.

Facilitated learning experiences using MOOCs expanded opportunities for learners regardless of geographic or socioeconomic status. Facilitated virtual learning allowed the learner to enroll in a course taught in a virtual environment by a certified teacher anywhere in the world (Janakiramn & Watson, 2018). Topics of digitally facilitated virtual learning included remedial and advanced mathematics, computer science, and career technical education courses for on-demand skill-based training. A key component of digitally facilitated virtual learning was the facilitator's role and the content specialist or certified instructor's role. The facilitator provided support for management tasks such as attendance, requirements, and completion activities. The content specialist or certified teacher acted as the active learning piece that provided content and expertise in the learning environment. In Janakiraman and Watson's (2018) study, a digitally facilitated virtual learning environment provided all learners with equitable educational opportunities to meet the learners' interests.

An initial study completed in 2010 on MOOCs found that adult learners who participated in asynchronous facilitated learning modules could solve problems collaboratively, clarify individual roles, and provide information from their perspective (Solomon, 2010). In a

continuation study by Janakiraman and Watson (2018), the limited number of completions during MOOCs' independent use was listed as a challenge of asynchronous learning. In Solomon's 2010 study on MOOCs, of the 53,491 registered learners, only 1,991 participants completed the courses, and only 20 learners agreed to be interviewed for the qualitative research study (Janakiraman & Watson, 2018). A noted limitation of the study conducted by Janakiraman and Watson (2018) was the absence of engagement with other users in the MOOC model. The delivery was asynchronous by design and did not include interactions with other users or collaborative activities. Interviewed participants indicated challenges in completion due to the asynchronous layout lacking engagement in materials. Integration of asynchronous learning into an online course facilitated with collaborative learning could enable learners to become problem solvers, understand the learner's role and interests in a group dynamic, and provide historical information from the learner's perspective to facilitate collaboration (Janakiraman & Watson, 2018).

#### Learning Object Repositories

Learning Object Repositories are a centralized location of knowledge in a virtual warehouse. Borba et al. (2016) referenced Khan Academy as a commonly accepted repository of information. Repositories such as Khan Academy provide instant access to knowledge and instruction to provide general education to a broader interest. In addition to expanded tutorials, learning resource depositories serve as a centralized data platform for instructional personnel to determine learner interest and competencies for certification or future planning.

In a 2017 study conducted by Ejikeme and Ezema on the potential of open access through learning object repositories in rural Nigeria, the researchers studied the use of open access institutional repositories at both an institutional and open access level. The study observed the number of available repositories and the content available in each. Overall, 39.5% of the

repositories in Nigeria were made up of scholarly journals, and 9.3% of the repositories included professional learning and workshop materials (Ejikeme & Ezema, 2019). The researchers discussed that, although the repositories exist in Nigeria, limited infrastructure and directed program software to support search functions were limitations in use. Ejikeme and Ezema (2019) noted that the journals available in the studied repository were effective means of communicating new research findings; however, finding the research was challenging on the repository. Although the repository contained valuable information, including scholarly journals and professional learning materials, access, and knowledge of locating the data and information was a limiting factor to use (Ejikeme & Ezema, 2019).

Focusing on the software used to deliver the learning object repositories, Becksford and Metkno (2018) completed a study on using a learning object repository to empower teaching excellence for distance students. The case study included the building of a learning object repository for Virginia Tech named Odyssey. The program was created to “support library instruction not just at Virginia Tech but around the world” (Becksford & Metkno, 2018, p. 121). The researchers uncovered the community’s needs through the creation process, which included access to the library for online and distance-learning students anytime, anywhere. The researchers surveyed both on-campus and distance learning students, and 13.5% of respondents stated they did not know how to use the library resources (Becksford & Mekno, 2018).

Interestingly, 64.7% of students surveyed stated they did not need access to library resources for distance learning. Using the data collected from the general survey, the researchers created Odyssey, which included accessible content and metadata that allowed the information to be as open as possible. A key focus was ensuring ease of use for the Virginia Tech faculty and students. By creating a web-based interface with clear direction from the website and home page

of the library sciences division at Virginia Tech, the researchers hoped to increase usage. The researchers found that the project is ongoing and must be consistently updated and catalogued to allow for open access and ease of use from the project. Users only access content via the learning object repository if the content is known to exist within the program; therefore, constant updating and expansion of information must be a priority when launching a successful learning object repository (Becksford & Mekno, 2018).

### **Social Networking**

Borba et al. (2016) observed that social networking is a powerful tool to expand instruction outside of content seat time. Instruction is no longer limited to the time in which the learner is in the seat, and social networking provided a communication tool to support learning 24 hours a day, seven days a week. Instant accessibility to an instructor through social media platforms such as Edmodo, Facebook, and Twitter provided an instructor the opportunity to expand, reteach, and intervene with no time constraints. Ross et al. (2015) conducted a qualitative study using Twitter's social media platform to fulfill professional development needs. After using Twitter's social media platform as the delivery method for professional learning, researchers interviewed 32 educators. The researchers found that the initial tweet (post) was not the most valuable professional development experience component. Still, the ability to continue the conversation via comments and discussion as an offset of the initial tweet expanded the audience and professional learning network. Ross et al. (2015) discovered that Twitter, as a social media platform for professional learning, made the educators feel more fulfilled through instant feedback and live interaction. The use of Twitter for professional learning provided “anytime-anywhere-personalized learning opportunities” (Ross et al., 2015, p. 73).

Visser et al. (2014) discovered that up to 41% of teachers use social media multiple times per day (more than two) for advice and ideas for classroom implementation. Fancera (2020) completed a case study focusing on school leaders and Twitter as a social media delivery model for educators. Fancera (2020) sampled six different school or district leadership teams to determine which social media platforms leaders perceived as most useful for teacher professional learning. From the interviews with each participant group, five themes emerged: (a) personalized professional learning, (b) leadership to model and encourage use, (c) eliminating barriers, (d) credit towards recertification, and (e) preferred platforms. Social media provided an opportunity to personalize professional learning. Participants were able to share information from other sources to a greater audience in one “retweet.” The participants also commented that even though Twitter is not the only platform, it was the preferred platform by all participants. The use of Twitter was a quick snapshot with available hyperlinks for immediate and pertinent information. One participant stated, “I see this as just being another vehicle. This is not me letting go of in-person Professional Development.” (Fancera, 2020, p. 669)

#### Self-Directed Virtual Learning

Fleming et al. (2017) completed a study on factors that may influence a virtual learning platform for professional learning. The researchers completed a study to determine if a correlation existed between the learner's age, the complexity of the task, available technical support, and authentic learning related to the learner's use of technology. In a study of 77 participants, the researchers found no correlation between age and the ability to find satisfaction while using technology for learning ( $r = -.001, p < .05$ ). The researchers also found no correlation between the availability of technical support and the age of users ( $r = .09, p < .05$ ).

The researchers determined a strong correlation between the online program's complexity and satisfaction in the program ( $r = .43, p < .0001$ ). The more online attributes and tools the



program utilized, the lower the satisfaction rate by participants. The research conducted by Fleming et al. (2017) determined that age and technical support were not barriers to effective virtual learning for adult learners; however, the complexity of the online content and format were considerations when launching an online or blended course.

Beach (2016) conducted a qualitative study on self-directed learning, focusing on examining the model for an effective delivery method of professional development for educators in a digital setting. The study provided 15 practicing elementary teachers with a website that contained professional learning articles and implementation strategies on reading comprehension. The researcher surveyed the participants on their ability to navigate and apply the information provided. Beach (2016) identified nine essential themes related to professional development course navigation and participant experiences.

The first series of themes analyzed in the study related to the teachers' ability to find relevant information on current education trends. Participants noted the validity of the content presented as a critical factor in utilizing an academic website as the foundation for further research and professional learning. Related to the validity of academic standards content, the participants also shared the importance of finding valid topics in areas that pertain to classroom strategies for actual implementation. Beach (2016) suggested when the elementary teachers are given choice and opportunity to guide the topics of study, an immediate and authentic application of knowledge in the classroom setting occurred. The third theme within the series of relevance was the request for ease of access to provided information. Participants indicated that the ease of access and grouping of relevant information provided effective use of time, so educators are not “wasting your time searching the internet” (Beach, 2016 p. 67).

The second series of themes in Beach's study (2016) included the elementary teachers' ability to reflect on learning and education continuation. One of the study's website attributes was teachers' recordings in a live classroom performing the tasks discussed in the self-directed learning experience. Study participants shared the importance of viewing the implementation of professional learning in a real, not theoretical, situation. Viewing professional learning examples increased self-efficacy in the elementary teachers in Beach's (2016) study. Although the research study did not explicitly indicate an area or task which required participant reflection, Beach (2016) suggested that participants saved pertinent information for further review or study to enhance the understanding of the topics.

One aspect of Beach's (2016) research for consideration is the demographic makeup of the participants. Participation in the study was voluntary, and recruitment occurred via word of mouth and university exposure. Of the 15 participants, 80% were female, and 60% had between 5-15 years of teaching experience. Eighty-seven percent of participants expressed strong comfort in using the internet, and 88% indicate using the internet daily. The limitations on the demographics to participants over 49 years of age or with limited teaching experience of fewer than five years narrowed the scope of participation to those who have a strong understanding of digital tools and a foundation in pedagogy. Beach's (2016) study indicated further research on the relationship between age and use of a self-directed learning environment should be considered.

### **Access and Equity of Professional Learning in a Rural School Districts**

When providing centralized professional development for educators, a rural school district must provide solutions to avoid isolation and overcome extreme distance for attendance. Travel to a centralized location for face-to-face professional learning may be limited due to

travel costs. As professional development is an essential component of a teacher's career and is required for the recertification and issuance of a teaching certificate in the United States, providing professional development opportunities is vital in maintaining an effective workforce in education (Maher & Prescott, 2017). The healthcare profession, a profession that also requires continuous education to maintain an effective workforce, polled rural area workers on the limitations for attendance at professional development opportunities. The polled workers listed a lack of funding from the organization (45.8%), personal time commitment for travel and attendance (69.6%), and geographic isolation (85.7%) as crucial factors in the inability to complete required professional learning hours for certification (Curran, Fleet & Kirby, 2006).

In a comparative study completed on Chinese rural school districts, Wang et al. (2017) examined the impact of a face-to-face professional learning community focused on continuous, sustained professional development in China. Wang et al. (2017) used a two-prong approach. The first prong was to hire top talent, and the second prong, the focus of the study, was to build school capacity by improving teaching through professional learning communities. The researchers observed that 57% of urban school districts in China participated in a learning community once or twice per month compared to a rural school participation rate of only 14% once or twice per month. Wang et al. (2017) compared a rural school focusing on holding professional learning communities once or twice per month with a rural school that did not provide professional learning communities. The poll results indicated the school with a professional learning community had less teacher turnover and a 4% growth in assessment scores in one year (Wang et al., 2017). Multiple factors could attribute to the limited increase in test scores, and the researchers suggested additional research to determine which factors have the strongest correlation to achievement scores.

The Institute of Education Sciences reviewed the professional development offerings for teachers in rural and non-rural schools in Oklahoma in 2017. The review found that out of the 1609 participating public rural schools, only 60% of the rural public schools had the opportunity to participate in professional learning activities during the 2016/2017 school year. In-house teaching staff facilitated many of the provided opportunities. The delivery method of professional development with the highest attendance used a contracted trainer on-site, with 45% of the staff attending. The opportunity with the lowest participation rate (24 %) was the video-based workshop completed asynchronously by the educator (Petola et al., 2017). In addition, the Institute of Educational Sciences review provided data that only 37% of rural schools were dedicated to common planning or professional learning time for staff development. Staff interviews indicated that scheduling conflicts for professional learning opportunities due to distance or cost were the most substantial barrier in participating in professional development (Petola et al. 2017). Of the 37% of rural schools in Oklahoma that provided collaborative planning time, only 53% of those indicated rural schools provided an online space to collaborate or collaborate with other schools, both rural and non-rural. Overall, the Institute of Educational Sciences study (Petola et al., 2017) indicated that meeting in person and having an extended professional learning community through in-person or online support is an essential factor in the success of collaboration and implementation of learned material.

A vital component of a virtual learning model is the virtual or asynchronous delivery of content from professional sources outside of the school building. In a qualitative interview study on video conferencing in professional learning, Maher and Prescott (2017) utilized recorded anecdotal discussions on the teachers' feelings about video conferencing. Maher and Prescott (2017) stated that 95% of participants in video conferencing models of professional learning

completed the online tasks' learning objectives. Although the video conferencing model allowed time and opportunity for participants to talk informally about teaching and individual needs in the profession, the training lacked collaboration and meaningful content, as indicated in the participant feedback (Maher & Prescott, 2017). Collaborative activities during a video conference were limited compared to a face-to-face setting. Face-to-face settings provided one-on-one interactions as well as group interactions for participants with similar needs or questions. The video conferencing sessions diminished social presence and offered little opportunity to chat since the sole delivery method was through a presenter-to-group model (Maher & Prescott, 2017).

When asked about video conferencing sessions' benefits, the participants highlighted the increase of access without extraneous travel, saving time and energy. The professional learning offered was easily accessible with flexibility for individual schedules. The researchers also noted that, by removing the travel component, video conferencing decreased professional development cost by 65%. The absence of travel provides cost savings to the district and increased planning time for collaboration and implementation. However, limited collaborative interaction opportunities existed in the study, and one participant indicated, "You feel more motivated to stay in contact if you've met in person, whereas video conferences can be distancing" (Maher & Prescott, 2017, p. 529).

### **Summary**

The literature review began with professional learning needs and perceptions and shared the changing landscape of professional learning due to the COVID-19 pandemic. Educators expressed needs for variety, ease of access, and on-demand learning in a digital environment. A review of Maslow's self-actualization theory (1943) and Gunter and Reeves's (2017) mixed-

methods study on engagement in professional learning expressed through Kearsley and Schneiderman's 1998 theory of engagement explained the need for collaboration and engagement in a virtual or blended learning environment for educators.

The use of technology is founded in the selection of hardware and software to deliver content (Brown et al., 2017). Based on teacher needs assessments, multiple approaches to technology-enhanced learning were reviewed, including blended learning, facilitated learning, learning resource repositories, social media, and self-directed learning opportunities. Each approach utilized technology and shared various methods and concerns for the utilization of the given method.

As part of educators' needs, educators disclosed a lack of engagement in both face-to-face and virtual professional learning environments due to the limited use of digital tools and the limitations of access. Limitations of access exist in professional learning placed on the adult learner in a rural environment when educators do not have access to technology tools that provide greater audience collaborative opportunities. The literature review supports the need for additional research to discover how virtual learning tools influence a professional development opportunity.

### III. METHODOLOGY

#### **Introduction**

The purpose of the qualitative case study was to discover how the use of various digital tools presented within a virtual professional learning opportunity influenced professional development for teachers in a rural school district. Research of delivery methods of professional learning provided insight into virtual learning opportunities focused on meaningful, sustainable professional learning for teachers in rural and urban school districts. Utilizing a virtual learning methodology for a sustainable professional learning opportunity for educators in a rural school district during a pandemic, the data collected provided insight into how a virtual learning delivery model and digital tools can be integrated into educational professional learning opportunities in all school districts. In chapter III, the methodology of the qualitative case study is presented. An in-depth overview of the research addresses the design, data collection, ethical considerations, and trustworthiness.

#### **Research Design**

An exploratory qualitative case study was utilized for the study. An exploratory qualitative case study is used to determine possible outcomes by interviewing participants and observing changes in opinions and activity resulting from an action. Case study research is described as an inquiry into a holistic approach that may have many variables that contribute to outcomes (Creswell & Poth, 2018). The exploratory case study model was utilized to observe

various outcomes when using virtual learning models for professional learning in K-12 education. The COVID-19 pandemic limited person-to-person interaction globally; therefore, the relevance of a case study in virtual learning opportunities was timely, and the insights from teacher feedback were immediately applicable. The influence of a virtual learning model on the perceived effectiveness of content implementation was reviewed as part of the study. Interviews were conducted as part of the exploratory case study regarding virtual learning perceptions, and the participant responses highlighted themes that emerged from data collection (Creswell & Poth, 2018).

K-12 teachers in a rural school district in Florida during the COVID-19 pandemic served as the voluntary participants in the case study. Obtaining significant statements from participants through an interview process provided an opportunity to observe themes from a cross-case analysis of interviews and an collection of descriptions of participant experiences (Creswell & Poth, 2018). The collection of lesson plans from participants provided insight into the relationship between the provided professional learning and implementation to strengthen the study (Creswell & Poth, 2018). The teachers participating in the study were active teachers during the 2020-2021 school year in a rural school district in Florida. Virtual learning became a necessary delivery model during the COVID-19 pandemic. Teacher perceptions regarding engagement and teachers' perceptions about the opportunities the virtual learning experience provided were collected through the interview process and to observe the implementation of learned content exhibited through submitted lesson plans.

### **Context of the Study**

In a qualitative explorative case study, the research occurs in an observational setting, allowing participants to engage in the task at hand without interference from the researcher



(Creswell & Poth, 2018). The research took place in a rural school district in Florida. The district serves 8,500 students, and 53% of these students received free or reduced lunch. Exceptional education students comprised 19.6% of the student population, and 19% were classified as English language learners. The school district spans 106 miles in length and includes 10 non-charter public schools, six public charter schools, and three private K-12 schools. The public charter schools and private K-12 schools were not included in the sample size as no participants from the charter or private school participated in the voluntary professional development. The school district in the study is considered a rural school district due to the population and area ratio.

Teachers from the public schools voluntarily participated in a 30-day professional development program focused on using technology through digital tools. The program focused on one initial synchronous learning experience for 2 hours and follow-up voluntary sessions for semi-synchronous learning given one time per week for the 3 weeks following the initial learning experience. After the training, participants were awarded 20 professional learning points in the area of educational technology. Solicitation for participation in the program was limited to 50 certified teachers. Participants in the professional development training were then asked to voluntarily participate in an interview and submit lesson plans. Participants in the professional development opportunity who elected to complete interviews and submit lesson plans for the study could do so at any time after the conclusion of the 30-day professional learning opportunity. Interviews were scheduled based on completing a volunteer participant form, which included acknowledging participation in the study and available time frames for scheduling an interview. The interview took place after the 30-day program. The interviews were conducted using the participant's choice in video conferencing platforms at the convenience of the

participants' schedule and were recorded with permission. Participants also had the option to utilize video and audio functions to limit recording to audio-only.

As part of the follow-up requirements to receive professional learning points, all participants in the professional learning opportunity were required to submit at least one lesson plan for follow-up documentation. For the study participants, participants selected up to three lesson plans for submission and acknowledged their use in the research study. The lesson plans that the study participants chose to submit for the study were then submitted separately from the submission of the one plan submitted for professional development points. Lesson plans were evaluated using the Technology Integration Matrix (Florida Center for Instructional Technology, 2021) to identify perceived technology implementation in the classroom after the training took place.

### **Research Questions**

The discovery of how virtual learning influenced a professional development opportunity on the implementation of technology for teachers in a rural school district focused on the following research questions:

1. What influence does the use of various digital tools have on the perceived effectiveness of professional development?
2. What are the perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development?

### **Research Participants**

The research participants were selected based on voluntary participation in professional development. Participants first met the criterion of participation in the professional learning opportunity. Forty-two participants enrolled in the virtual learning experience focused on

implementing digital tools, and 38 of those participants completed the course follow-up. Twenty participants initially agreed to be part of the case study, and ten completed the oral interview. Only 10 participants of the initial 20 initial participants also submitted lesson plans for the study; therefore, the study only analyzed the data from the 10 participants who completed an oral interview and submitted at least one lesson plan.

Table 1 indicates the study participants' demographics by the length in the profession, area of focus, degree, and gender. Participants in the study represented elementary, middle, and high school grade bands with an educational experience between 3 and 21 years. Four participants were elementary grade teachers, and their teaching experience ranged from two to seventeen years. Three participants were middle school teachers, and their years of experience ranged from five to twenty-one years. Five participants were high school teachers, and three of them had five to fifteen years of experience. The other two participants had five years of teaching experience. Of the 10 included participants, 50% held a master's degree or higher in education; however, the specificity of the background of the bachelor's degrees awarded was not in the purview of the study.

Table 1

*Participants' Demographic Information*

<b>Participant Assigned Numbers</b>	<b>Teaching Experience</b>	<b>Grade Level Subject Focus</b>	<b>Education Level</b>	<b>Gender</b>
1	3	K-5 Science	Bachelors	Male
2	17	K-5 Reading/ELA	Bachelors	Female
3	15	9-12 Reading/ ELA	Masters	Male
4	21	6-8 Social Studies	Masters	Female
5	5	K-5 Mathematics	Bachelors	Male
6	5	9-12 Geometry	Masters	Male
7	8	6-8 English	Masters	Female
8	2	K-5 Mathematics	Ph.D.	Female
9	5	6-8 Mathematics	Bachelors	Male
10	3	9-12 Science/BIO	Bachelors	Female

**Role of the Researcher**

Observation, collection, review, and reporting of data are the primary roles of a qualitative researcher (Creswell & Poth, 2018). Using a voluntary sample in a district removes bias and special considerations for participants in the study. A main goal of the researcher was to guide the participants and gather the data in a meaningful way. The researcher worked in the same district as the participants.

The study was conducted by a researcher employed within the district for 15 years. Training on the Technology Integration Matrix was ongoing. The Technology Integration Matrix was implemented with the Technology Perceptions Survey (Florida Center for Instructional Technology, 2021) in multiple schools throughout the state. As a standing member of the

professional learning and curriculum team for the school district, the researcher participated in district wide professional learning logistics but did not have any direct supervisory role over any participants in the study.

Due to the COVID-19 pandemic, state and federal limitations prevented face-to-face interaction within large groups and closed public schools beginning March 2020. The limitations in the interest of public safety prevented face-to-face professional development opportunities from occurring. Observing a shift to virtual settings for on-demand learning due to the pandemic, the question was raised about the perceived effectiveness of implementing the content presented in the virtual setting. A summation of the perceived effectiveness of professional learning was established through interviews with participants and the collection of data based on participant submission of lesson plans related to the professional development content. Recruitment for participation in the professional learning opportunity and the final award of professional learning credit was independent of the study to prevent bias within the study.

### **Measures for Ethical Protection**

All research was conducted with approval from the Southeastern University Institutional Review Board (IRB) to protect the participants. Approval of the study was obtained from the department of professional learning in the school district in which the research was conducted. The school district utilized in the study did request access to review the study findings for future considerations. Each participant in the professional learning opportunity was also notified of the opportunity to participate in a case study. Volunteer participants agreed to all recordings and lesson plans for review in the study through informed consent. Participants were informed of the low level of risk associated with the study and the opportunity to review all recordings and documentation. Any review of submitted lesson plans was completed using the Technology

Integration Matrix (Florida Center for Instructional Technology, 2021), removed from public documentation, and stored electronically. Each participant was assigned a code to align the interview with submitted lesson plans; however, no identifiable information was submitted in the final research or documentation.

### **Methods to Address Validity and Reliability**

Creswell and Poth (2018) stated a study should be reviewed for validity. The study should be viewed through the researcher's lens and the participants' lens. To maintain validity in the study from the participants' lens (Creswell & Poth, 2018), a review of transcripts was completed and confirmed by the participants. Each interviewed participant was also provided the opportunity to review lesson plan alignment to the Technology Integration Matrix (Florida Center for Instructional Technology, 2021). Participants were asked to acknowledge the interview's validity after reviewing the transcript. In only in extreme cases, a participant's request to modify or delete data to maintain the study's validity was granted. The one participant who wished to modify a response did so and confirmed the modified response. The initial response was stricken from the data set. The dissertation chair and methodologist reviewed transcripts and lesson plans with checks at all data collection stages from the interview to analysis.

### **Reliability**

Reliability can be achieved through "replication and transparency" (Yin, 2014, p. 280). All interviews were recorded using a video conferencing tool on the researcher's laptop computer and stored in a cloud storage system. The interviews were transcribed using a transcription service and then reviewed individually by the researcher for accuracy and verbatim

transcription. All submitted archival documents, such as lesson plans, were also available to the participant, researcher, and reviewer through a secure cloud-based system.

### **Data Collection**

Interviews of participants using video conferencing software was completed at the professional development opportunity's conclusion. The participants were provided with the interview questions 24 hours ahead of time to allow for thought and participant preparedness. To allow for social distancing, the interviews were conducted via a video conferencing platform and to provide an environment that met the participants' needs, the interview was conducted with the option for cameras on or off. Pre-determined interview questions were used to maintain consistency amongst participants and administrations (Appendix A). The interviews were an average of 30 minutes in length. Five participants were unable to commit to a video conference, submitted responses to the interview questions via written reply, and did not provide supporting lesson plans to align with the written responses; therefore, they were not included in the study.

In addition to the interviews, participants submitted up to three lesson plans demonstrating technology implementation in the classroom. Each lesson plan was measured using the Technology Integration Matrix (Florida Center for Instructional Technology, 2021) to determine the participant's integrated technology from entry-level to a transformative level as indicated on the Technology Integration Matrix. Each Technology Integration Matrix level measured student engagement through technology (Florida Center for Instructional Technology, 2021). The focus of the evaluation was the areas of (a) entry-level, (b) adaptation, and (c) transformation, as exhibited in the lesson plans to maintain the qualitative measurement of the case study as indicated in Appendix B.

## **Data Analysis**

The use of keyword coding (Creswell & Poth, 2018) was used to analyze interview data. A within-case and cross-case analysis of the data set allowed themes to emerge from the raw data (Chingh et al., 2019). The within-case analysis included anecdotal comments that could be categorized based on the nature of the question asked. The interview questions were pre-categorized for the organization of information. Table 2 indicates the pre-determined categories for organizing anecdotal information received from the interview process across all interviews. Once the initial identification of key ideas or phrases was completed and documented, a cross-case analysis was completed within the 10 interviews to determine categories. The categories provided an organizational structure to determine a theme related to perceived engagement in virtual learning. Lesson plan artifacts, activities, and notes from each lesson plan were associated with the Technology Integration Matrix's domains. Categories based on survey questions and the TIM matrix provided a coding structure to align lesson plans with the Technology Integration Matrix's specific areas, as exhibited in Appendix B.

## **Managing and Organizing the Data**

Participant data was managed and organized by first removing all identifiable factors, and a random number was assigned to each participant and corresponding lesson plans. Codes were organized by key concepts. To secure access to the individual study participant, the researcher, and the reviewer, storage of all interviews and submitted lesson plans exists in a password-protected folder notated only with the participant's assigned number. Participants' assigned numbers also correlated to primary demographic data, as indicated in Table 1. Uploading of transcribed data was completed in a digital format, and each recording was reviewed multiple times to assign the statement or phrase associated with each participant (Creswell & Poth, 2018).



The categories provided an organized review of key ideas and themes based on participant interviews, as shown in table 2.

Table 2

*Excerpt of codebook from interview questions*

<b>Geography and Participation</b>	<b>Use of Digital Tools</b>	<b>Digital Literacy and Online Delivery Model</b>	<b>Professional Community and Sustained Learning</b>
<b>P1- Two hours Driving Each Direction</b>	P2- So many tools, I spend more time learning the tool than the purpose.	P1- sometimes I just click through without paying attention.	P3- I would never have made it through this year without other teachers and Facebook groups
<b>P3 – Circumstances required participation virtually</b>	P4- It was fun to collaborate with others using digital tools, and it can be used in the classroom with students.	P5- I could read this from a textbook or a news article. I don't need a fancy program to do this by myself. I do that anyway.	P9- It takes me more than one time to grasp new concepts. I need time to learn, implement, and then review.
<b>P8- Never been to a conference outside of district before</b>	P9- It was like we were the students, and it was a classroom for virtual learning.	P8- It is like an online class in college. I don't get to talk to anyone, and the discussions are not always engaging.	P7- My sanity came from the people around me, I am not a techy person, so I needed all the support I could get.
<b>P5- Ease of access to do on my own time</b>	P7- It is like learning how to teach all over again.	P4- I want to see it in action; I want to talk to someone about how it works.	P4- Constantly learning the new thing doesn't help me become a master at anything.
<b>P9- I don't want to work outside of my contract, including travel</b>	P5- This is all great until the internet goes out.	P6- It is more fun in breakout rooms and time to work with each other, not just listen and write.	P9- It is nice to bounce ideas around and participate in the process, not just the learning.
<b>P6- Never reimbursed for gas, so I do not travel. Online works but becomes overwhelming for sign-on and attention.</b>	P1- "Our District" makes us use all this technology, but Google is the one I use because the kids get it.	P9- The tools really help us take best practices and put them into action regardless of the delivery.	P1- It's better now that we can do it on our own to build community and are not required to be sitting somewhere at a certain place or time.

Once themes were established from the categories within the interview questions' structure, an additional review of the transcribed interviews was completed to derive meaning and establish themes (Creswell & Poth, 2018). Each theme was identified based on data from interviews, including significant statements and definitions of each theme. Themes were entered into a second codebook, and related anecdotal information was recorded from the given interviews. The interviews contained four significant themes: access, use of digital tools for engagement, implementation in the classroom, and building community.

Each lesson plan was reviewed, and key ideas were categorized into three subgroups independent of the relationship to the participant to determine the levels of (a) entry, (b) adaptation, and (c) transformation as aligned to the Technology Integration Matrix (Florida Center for Instructional Technology, n.d.). The lesson plans were collected and compared to the Technology Integration Matrix. The comparison provided the researcher with data to review perceived effectiveness through implementation aligned with related themes and technology implementation using digital tools in the K-12 environment. The categorization of collected lesson plans based on matrix levels is displayed in Table 3.

Table 3

*Codebook of Lesson Plans aligned with Technology Integration Matrix*

	<b>Entry</b>	<b>Adaptation</b>	<b>Transformation</b>
<b>Active</b>	PowerPoint Delivery of Content over Google	Students are completing a book report using Book Creator or Slides	XXX
<b>Collaborative</b>	Students are independently taking notes	Students are completing a Padlet in groups	Virtual field trip with Mote Marine  Students are visiting colleges on virtual field trips that are closed down due to COVID-19
<b>Constructive</b>	Use of online textbook (5)	A research project using listed sites to review history.  Use of online articles to facilitate a philosophical chair activity	Create a movie trailer for the upcoming inauguration
<b>Authentic</b>	Use of Online Textbook (5)	Create a TikTok goodbye to 2020	XXX
<b>Goal-Directed</b>	TODO list of activities (8)	Choice Boards (5) to select activity within a content area	Create a presentation regarding a political agenda item, including interviews.

**Representing and Visualizing the Data**

Completion of a cross-case analyses of the interviews extracted common themes or perceptions related to the delivery of virtual professional development opportunities. The use of multiple measures allowed the researcher to determine key themes and maintain consistency in representing the collected data. After themes were established, a narrative approach was used to

align components noted in submitted lesson plans with key elements within the Technology Integration Matrix indicators. Yin (2018) stated that cross-case analysis between interviews and again through lesson plan collection could identify patterns and differences between various cases. Demographic information including focus, gender, and years of experience was collected; however, an analysis of demographic data was not completed.

### **Summary**

The methodology presented in Chapter III outlined the data collection and analysis used in this study to discover how a virtual learning opportunity using various digital tools influenced professional development for teachers in a rural school district. The data collected included interviews and submission of lesson plans to determine the virtual learning experience's influence. Each participant in the study had the opportunity to review and validate all submitted interview and lesson plan artifacts. All identities were kept confidential through a secure cloud-based document storage system. A description and explanation of the coding process were provided to determine themes and implementation validity due to the interview and lesson plan submission. An additional description of lesson plans' analyses against the Technology Integration Matrix increased the study's validity. An analysis of key themes and findings from the data collection, as aligned with the theory of engagement and self-motivation (Gunther & Reeves, 2017), is provided in chapter IV.

#### IV. RESULTS

The purpose of this case study was to discover how the use of various digital tools to present a virtual professional learning opportunity influenced perceptions and implementation of professional development for teachers in a rural school district. The study examined teacher perceptions of virtual delivery models as a method of professional development. Also included is a review of implementation of the delivered content in a virtual professional development opportunity as compared to the Technology Integration Matrix. The virtual professional development opportunity during the COVID-19 pandemic provided an additional lens into the perceived necessity of a virtual learning modality for professional development opportunities. This case study is not the first case study on virtual learning modalities; however, the study focused on teachers' perceptions of virtual learning opportunities during a pandemic. The case study methodology provided an in-depth view into teacher perceptions on virtual learning, including the importance of access in rural communities, professional communities, and the use of digital tools. Chapter IV provides a cross-case analysis of interviews from teachers about the perceived effectiveness of the virtual delivery model and a cross- case analysis of submitted lesson plans as compared to the Technology Integration Matrix. Both and cross-case analyses contributed to the results of the qualitative case study.

The results of the study to discover how a virtual learning opportunity using various digital tools influenced professional development for teachers in a rural school district focused

on the following research questions:

1. What influence does the use of various digital tools have on the perceived effectiveness of professional development?
2. What are the perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development?

Emerging themes related to the research questions above, including demographics and samples from 10 different participant interviews are included in the data analysis. The analysis took place at two levels: (a) cross-case analysis of participant interviews; (b) cross-case analysis of submitted lesson plans aligned to the Technology Integration Matrix to discover emergent themes of teacher perceptions and implementation. Each level of analysis included a general comparison and organization of themes emerging from the data collected. The results included both a narrative form and visual form through tables and charts to emphasize the narrative analysis themes.

### **Sample**

Forty-two teachers participated in the provided professional development. Of the 42 professional development participants, 34 completed the professional development sessions, and ten participated in the interview and lesson plan submission process as part of the qualitative case study. Table 1 displays the demographic data of each participant as described in Chapter III.

Table 1

*Participants' Demographic Information*

<b>Participant Assigned Numbers</b>	<b>Teaching Experience</b>	<b>Grade Level Subject Focus</b>	<b>Education Level</b>	<b>Gender</b>
1	3	K-5 Science	Bachelors	Male
2	17	K-5 Reading/ELA	Bachelors	Female
3	15	9-12 Reading/ ELA	Masters	Male
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5	5	K-5 Mathematics	Bachelors	Male
6	5	9-12 Geometry	Masters	Male
7	8	6-8 English	Masters	Female
8	2	K-5 Mathematics	Ph.D.	Female
9	5	6-8 Mathematics	Bachelors	Male
10	3	9-12 Science/BIO	Bachelors	Female

**Data Collection**

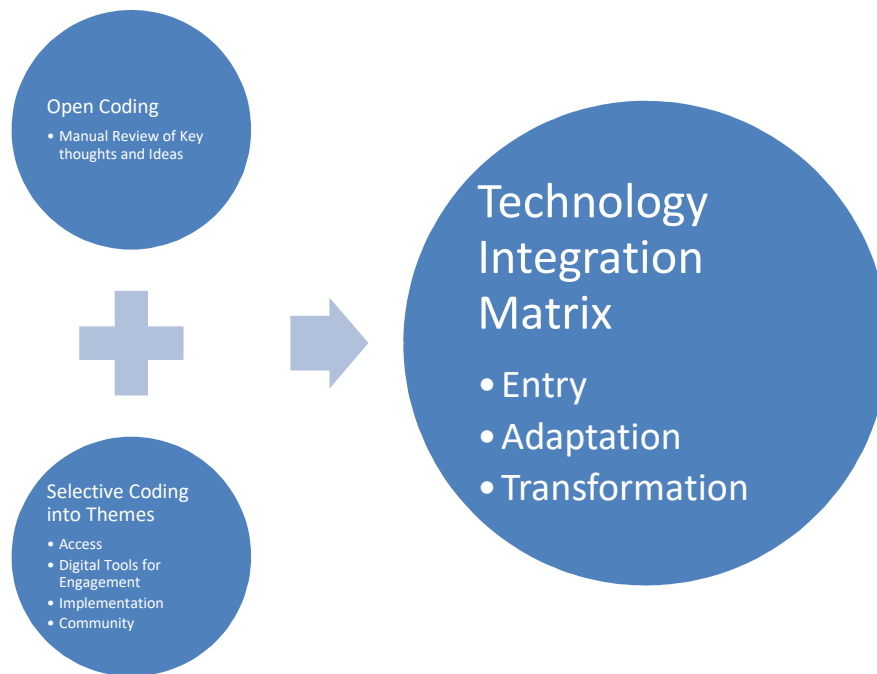
A virtual interview was conducted with 10 participants using a video conferencing tool. Demographics were obtained as part of the professional development enrollment information for all professional learning participants but were not included in the research analysis due to limitations of collected demographic validity. After all interviews and submissions were completed, each interview was assigned a number to align with the participant's submitted lesson plan and preserve anonymity. All other identifying information was removed from the interview data. Each interview was transcribed and then reviewed on an individual level multiple times to identify themes within each interview. Once individual reviews were completed, interviews were coded for emergent themes amongst all participants in a cross-case analysis. Keywords and



phrases were highlighted and placed in unnamed categories to determine commonalities within responses. An additional review of the data was conducted to determine case study thematic coding strategies as part of the research process. Interview protocols and questions are provided in Appendix A.

### **Data and Analysis**

All interviews were conducted through digital video conferencing software and were initially categorized using the pre-determined categories established in the interview protocol. The interviews were analyzed individually, with no more than two interviews reviewed at a single sitting. Each interview was reviewed for keywords and opinions within the interviews. The cross-case analysis resulted in four themes consistent throughout interviews; (1) access, (2) digital tools for engagement, (3) implementation of learned content, and (4) community. The lesson plans' analysis aligned to the Technology Integration Matrix categories: active, collaborative, constructive, authentic, and goal-driven through the lens of an entry phase, an adaption phase, and a transformation phase. As the interviews provided themes and anecdotal data reflecting engagement and perceptions on participation in virtual professional learning, the lesson plan review using the Technology Integration Matrix provided an analysis of technology's actual implementation. Figure 1 includes how open coding and selective coding took place within the interviews and where anecdotal information was assigned a theme reflected in the Technology Integration Matrix.



*Figure 1. Data and analysis process*

### **Research Questions**

The study participants validated the interview transcripts, and once confirmed, the lesson plans and submitted lesson plans were analyzed. Multiple codebooks were used to ensure a clear understanding of the participants' intent and perceptions regarding virtual learning delivery models.

#### **Research Question 1**

What influence does the use of various digital tools have on the perceived effectiveness of professional development?

Six questions in the interview were established to help measure the influence of digital tools on perceived effectiveness in a virtual professional development setting. The initial question was how educators felt about using digital tools to engage in virtual professional learning opportunities. Within the context of engagement, participant one, who shared that she was an advocate of self-paced learning and “finding things independently,” found that the use of

digital tools in a virtual environment created a “more engaging environment”. Participant three, a 15-year veteran of teaching in high school English language arts, shared the enjoyment of increased engagement and opportunities to collaborate. “The use of various tools has made a difference, and it is not just sit and get any more.” Participant three also referenced a district-wide initiative focused on engagement and collaboration that had “made its way into the digital world.” One participant related the engagement to the ability to collaborate in an informal way using digital tools that have changed the perception of online learning. Also, a high school teacher, who had previously taken online courses to obtain a master’s degree, stated that “using (digital tools) to have a real authentic conversation is so much better than before.”

Not all participants were as optimistic about the use of digital tools to engage learners. Two of the three elementary teachers interviewed were very concerned about the inability to determine a digital tool's function and the function as a barrier within the collaborative process. One of the participant responses indicated a struggle with the hardware in addition to the digital software, stating that “technology is overwhelming, I’m not always engaged because I’m trying to figure (the digital tool) out.” The given statement aligned with a different response from another elementary teacher who stated, “I spend more time learning the tool than I do the tool's purpose, and I get caught up in the tool and then have no idea what I will use the tool for.” Overall, study participants acknowledged the power in the use of digital tools to increase engagement, and participant seven summarized the consensus that “digital tools create an engaging experience if they’re used correctly, we just have to make sure that all the users know how to use the tool itself.”

As the interviews continued, the participants were explicitly asked about the training tools and the impact on the engagement experience. Participant two, who had earlier commented

on the “great deal of time learning the tools versus engaging with the tools”, did state that learners “do not have to be glued to the screen the entire time to be engaged in the content,” when referencing the ability to use digital tools to participate in an asynchronous or semi-synchronous learning environment. In addition to the mention of specific digital tools used in training, participant five, an elementary teacher with five years of teaching experience, appreciated that the variety of tools available to use for a purpose was “great because it meets me at my level and my mood.” Multiple participants commented on the change in available tools from previous experiences in online learning. According to participant six, teachers have “increased respect (for) the teachers to complete work with a product” compared to a seat-time requirement for professional learning, acknowledging that educators can complete professional learning without supervision.

The discussion of comfort levels in working with engagement in a virtual learning experience was an unexpected response. Participants with less than five years of teaching and more than 20 years of teaching commented that practice is needed to create comfort with an online environment and build relationships for collaboration. Participant eight clarified that once the focus was not how to use the digital tool, the freedom allowed for “more engagement during the professional learning.”

The interview addressed the teachers’ expectations within a virtual professional learning experience. Although the question did not explicitly address digital tools or engagement, the information gathered provided insight into teachers' needs and wants in a professional development setting. All participants stated that relevance to the classroom was a key component of professional development. Participant one summarized the thought that teachers desire

“relevant training that they can use when back in the classroom.” Participant 8 elaborated on relevance with an “engaging, learning experience.”

Participants were asked to share experiences and knowledge of a learning management system, specifically Canvas by Instructure. Canvas was the learning management digital tool used to deliver virtual professional development. As a follow-up within the question, participants were asked if Canvas created a more engaging experience. A common response from teachers with less than ten years of teaching experience was a high level of comfort and knowledge of Canvas due to previous online courses. Participants did not consider Canvas a digital learning tool to increase engagement. Participant eight, a teacher with two years of teaching experience, did not find the learning management system “created more engagement.” Participant six, a master-level teacher with eight years of teaching experience who indicated prior Canvas use, noted the following:

I think that digital tools have made the learning experience much more engaging.

Implementing them in a learning management system like the training provided has made it easier for the user.

Participant five, an elementary educator, shared that engagement depends on the digital tool being used, stating:

Specific tools create a more engaging learning experience based on grade level. I don’t know about kindergarteners making videos of themselves on Flipgrid. Still, I also don’t think that using something like Kahoot is super engaging for a high school senior. It all depends on the purpose and the audience.

A subset of engagement with the content is the engagement with others as presented in the study related to professional learning communities. The questions regarding professional

learning communities were to discover if participation in a collaborative learning community impacted perceived engagement in the virtual learning experience. Participants in the study shared strong opinions about the importance of creating both a learning community within the building site and outside of the building site. Participant one shared the importance of both:

I think it's really important to have a professional learning community or a PLC from within our building site because it allows us to understand the students we are working with, such as demographics and population, and building the community from within. It is also great to have that extended community from other districts so we can learn what we don't know that we needed in the first place.

Concerning the pandemic specifically, participant two shared the power of a professional learning community during a crisis,

Teachers are surviving off of community right now, whether in the building or throughout the world. Without us working together, we would not be where we are today.

The sentiment echoed strongly throughout each interview, mentioning social media digital tools such as Facebook and Twitter by name as lifelines to a larger community of collaboration in a virtual learning environment. Relationship to needs and wants was not the only accompanying statement from within the importance of a professional learning community. Participant seven shared that “technology is giving us the opportunity to do that (reach out to others),” which supports the use of digital tools to increase engagement with others within the community.

## **Research Question 2**

What are the perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development?

The qualitative case study focused explicitly on implementing virtual learning in a rural school district to discover possible long-term applications for virtual professional development outside of a pandemic. Participants in the study were asked general questions about geographic limitations in a rural community related to professional development opportunities to discover if geography impacts participation in a virtual or face-to-face professional development opportunity. Participants provided mixed responses. Four participants specifically quoted travel as a barrier to professional development opportunities. Participant two stated that participation in face-to-face opportunities is limited due to price and “the district is not willing to pay for (hotel and travel costs).” Other participants did not want to waste “two hours of the day driving” to and from a professional development course. In contrast, some participants would “love the interaction of a face-to-face conference” as they “learn so much from the conversations outside of the actual learning.” Participant one stated that “having a virtual opportunity has helped receive the information quickly,” and participant four, a 21-year veteran teacher, shared that with virtual learning, “were able to share across the area without having to get in cars and waste two hours of the day driving.”

Geographical challenges also brought up access to professional development that was relevant and provided a choice to teachers. Participant one expressed that they wanted something that was “relevant to what they teach” when asked what they were looking for in professional development offerings. Participants five and eight both shared that in the rural district, options for teacher choice are limited as they “don’t get to choose what they want to go to because it’s too expensive or takes too long to leave the county.” In addition to lack of choice, participant five also shared the benefit of virtual professional learning as it provided flexibility and “increased access to complete tasks and activities.” Participant four shared that the length of

professional learning opportunities in a virtual format has also decreased, increasing their interest in completing the activities, stating:

I am more likely to participate in a virtual setting because now they are about an hour, no more than two hours, versus an entire day training. Having to take a lunch and then drive back and forth and make sure that your family is taken care of is a challenge. I think I am more likely to participate virtually because I can do it in my pajamas and pay attention.

Study participants were also asked the limitations of online professional learning, and the answers were varied. Male participants in the study commonly referenced the lack of hands-on experiences and limitation of the hardware itself. Participant six was concerned about “no human interaction and so many times do not see the smiles and nods or even the eye rolls.” Participant one was concerned about “authentic collaboration and off-the-record conversations that you have with your colleagues in a face-to-face environment.” Female participants referenced limitations such as community and sustainability in a virtual environment. Participant four specifically mentioned discussion boards as a limitation to virtual professional development sharing:

I think discussion boards are no more than just the response itself. No one actually goes back and replies more than the required amount, and is it really meaningful if the conversation is not continued?

Other limitations that participants mentioned included the lecture format of being spoken to instead of spoken with and the inability to dive deeper into a conversation when the conversation leaves the prescribed content.

One of the biggest limitations is the unspoken component of face-to-face learning. The conversations that occur at lunch and off the record are missing from the face-to-face component, said Participant Seven.



## **Themes**

The cross-case analysis of participant interviews revealed five consistent themes that echoed regardless of the questions being posed. Although the questions posed to each participant were asked through a specific lens, the questions' open-ended format allowed participants to elaborate on virtual learning and engagement, providing context and emergent themes from the case study data. Access, engagement, the necessity of technology, implementation in the classroom, and building community can be found throughout each interview.

### **Access**

Each participant is employed and lives in a rural school district in Florida within the participants' role. Discovering the perceived effectiveness of virtual professional development using digital tools in a rural school district came with additional participant responses related to limited access to face-to-face professional development opportunities. Opportunities such as conferences and live training were limited even before the pandemic. Participants also shared the noticeable lack of diversity within the training occurring within the school district, as the same participants from the district were always in attendance due to district size. Participant 10 shared that although new to the district, the same eight people have been present in training related to content for the last three years. The participant elaborated on the significance of collaborating outside of the school network:

Although I love collaborating with my science colleagues from the district in professional development, there is only a small group. The same people are always collaborating, so fresh ideas run out until someone new starts in our district.

The limited audience within district-provided professional learning creates limited access to new ideas referenced by participant seven in the “unspoken component of face-to-face learning.”

In addition to a geographic access limitation noted in the interviews, three of the participants in the study also perceived access to be defined as the ability to receive information in a digital format. Participant 10 commented about the importance of access to digital tools as a barrier to effective virtual professional development engagement.

If I cannot get into a program within three clicks, I become frustrated and don't want to participate anymore. I have enough passwords to remember, so for me to be engaged, I need to jump in without looking for my password and the navigation to use the tools. Participant five also referenced the limitations of access to digital tools in virtual training. In addition to the frustration of how to use technology, participant five remarked:

Do not show some great tool; get through how to use it, and then find out that it is not something I can use in our district. That is a waste of time and is frustrating when I am lesson planning.

## **Engagement**

The engagement was the foundation of the case study presented, and many questions within the interview process had a strong focus on engagement specifically. In addition to the direct references to engagement in a virtual professional development experience, participants shared the importance of engagement for a practical professional development experience. Participants are looking to find something “that can work for what I am teaching” (participant three). In cases, they remarked on actual engagement limitations through a lack of hands-on activities or constructed products in a virtual setting. Collaboration was also mentioned in conjunction with engagement opportunities as participants expressed, “the opportunity to collaborate and engage with others has changed my perspective on virtual professional learning, even in a social media space” (participant five). Participant seven feels that “digital tools have

made our learning experience much more engaging” and no longer “just another YouTube video.”

Participants shared the use of digital tools to increase engagement; however, all participants with more than 15 years of experience expressed frustration over taking all the training online. Participant nine remarked, “I know the training was remote due to safety concerns, but when participants are held after school or back-to-back in sessions, I find myself zoning out, turning off my camera, and doing other things.” Participant two shared the pain of eye strain and a new level of exhaustion, stating:

it is nothing like watching a sitcom at the end of the day. It is exhausting to stare at the computer all day in a virtual teaching experience and then have to be alert staring at a screen for additional trainings. Even if the topics are engaging, I find myself needing to take more frequent breaks to avoid fatigue, and then I end up missing something if I step away.

### **Implementation in the Classroom**

Implementation in the classroom was more evident through the submissions of lesson plans from participants; however, intended or practical implementation was referenced in all participant interviews. Participants acknowledged the ability to use digital tools in the classroom due to the professional development opportunity. As noted in figure 3 by participant three, “The practice with digital tools in training has given me the confidence to try to use the ‘given tool’ in my classroom to allow students to collaborate more often.” Participants in the case study indicated that when selecting professional development opportunities, they are “looking for things that are relevant to what I teach so I can use it when I go back in the classroom,” according to participant one. Participant six indicated virtual professional learning “modeling

how to use digital tools in other instances and made it easy to apply to a classroom.” The use of digital tools in a virtual professional learning experience “removes the technology barrier and more about teaching for effective practices using technology,” states participant seven.

Participant 8 did share apprehension about using digital tools in a professional development experience related to implementation in the classroom. Participant eight completed a Ph.D. online and is familiar with digital tools related to learning management systems but shared concerns about the students “staying focused” with so many different options available to them.

Virtual students can get caught up in the digital tool itself instead of the task at hand. All the cool features to increase engagement are amazing, except a student could become distracted when given a variety of emojis, stickers, and filters to place on a digital submission.

### **Building Community**

Two interview questions were directly related to the discussion of professional learning communities, which may have prompted the frequency in virtual learning discussion. Participant one shared he looks for a “group to complete the work with so that I have people to talk to about what worked and what did not.” Three of the males in the case study contributed at least one reference to collaborating with other group members either in a face-to-face or virtual setting as the desired item to look for when selecting professional learning opportunities. Participant six, when asked about the importance of a professional learning community, stated:

It is important to build a professional learning community, especially in times like these... and share with people in your group who are willing to try new things and not be

afraid to reach out to others in the same situation. I look for different perspectives and discussions with others.

Participant one highlighted the importance of building a community around the students they are working with to apply the information learned from a professional development opportunity. Participant one suggested the importance of beginning with a community in the building and then expanding out as needed, sharing:

It is really important to have a professional learning community from within our building as it allows us to have an understanding of the students teachers are working with and our demographics. Still, it is also great to have that option to extend our community through social media to find answers to things teachers may not know within the buildings.

The female study participants also shared the benefit of an expanded learning community. Whereas the male participants referenced reaching out to others in the same situation or talking with other participants in the professional development activity, female participants focused on connecting to a larger audience through technology. Participant four remarked that the “opportunity to collaborate through social media has been huge as it allows collaboration with people all over the world who might have ideas for this situation teachers are all in.” Participant 10, a self-proclaimed new teacher with three years of experience, shared:

Teaching is a lifelong learning experience. I learn more from my fellow teachers each day than any textbook. I have found myself joining groups online and attending repeating online conferences just to hear what other teachers have to share. The teaching community is strong with the support of other teachers; I don’t know how I would have made it this far without that support.

### **Classroom Integration through Lesson Planning**

An additional facet of the case study included participant submission of lesson plans to share the implementation of digital tools resulting from participation in a virtual professional development opportunity. Each participant in the study provided up to three lesson plans related to the Technology Integration Matrix. A total of 21 lesson plans were submitted for review by all study participants, with three participants submitting one lesson plan, three participants submitting two plans for review, and four participants submitting a total of three lesson plans to the study. Each lesson plan was reviewed for keywords using the predetermined categories provided from Technology Integration Matrix in Appendix B. Each category was divided into three integration levels, from an entry-level implementation of technology to a transformative level of integration within the classroom. The purpose of the lesson plan review was aligned with research question one to observe digital tools' influence on perceived effectiveness of professional development.

### **Collaborative**

Collaboration was a noticeable attribute within the lesson plans reviewed. The Technology Integration Matrix defines collaboration as the degree to which technology is used to work with peers inside and outside the classroom. The entry-level includes lesson plans focused on individual work using technology tools. The within-case analysis of the lesson plans observed 14 instances where the students independently took notes from an online textbook or article. Eight of the given instances were at the start of a lesson. They were followed up by an adaptive collaborative exercise such as completing a shared note-taking experience using digital tools or a collaborative digital review or processing of the notes taken independently. In each of the collaborative experiences listed, the teacher-directed the conventional use of digital tools and provided specific guidelines for completing the activity. In one instance, the lesson plan

submitted met the level of a transformative collaborative implementation, where students were provided a general prompt to “travel through the books various settings,” which allowed students to choose the digital tool to share a map or presentation of the different locations in a book that was being read in class. Although suggested digital tools were listed in the lesson plan, the submission's confines were not bound by a specific digital tool and allowed for student choice.

### **Constructive**

A constructive lens in the Technology Integration Matrix shows the connection between prior knowledge and current learning while actively receiving new information. In the lesson plans that directly mentioned a flipped or blended learning approach, each of the eight secondary lesson plans included watching a video or recorded lesson to receive the information. Passively watching a video is categorized as an entry-level action on the Technology Integration Matrix; however, three of the submitted lesson plans included using a digital tool to interact with the given video as it was presented. The teacher programmed the digital tool to ask questions at critical points of the videotaped instruction and required a summary in a digital format after the video. As the digital tool was prescribed as the tool of choice for lesson delivery, active participation falls under an adaptation level. Only one lesson plan submitted provided a transformative view of constructive information and the use of technology. The elementary-level plan allowed students to create a website or digital display related to the presidential inauguration. Students were not bound by a specific digital tool and were given access to multiple tools to complete the task. Students were applying the information received about the presidential inauguration to a real-life application through digital tools.

### **Authentic**

According to the Technology Integration Matrix, authentic implementation of technology within a classroom applies to real-world and sustained access to information through technology. As stated in the other themes established by the Technology Integration Matrix, all the lesson plans met the entry-level requirements for using digital tools to deliver content. In all submitted lesson plans, activities were aligned to prescribed standards and included references to state-adopted digital instructional materials such as digital textbooks and online programs. One lesson plan at the middle school level was submitted using social media TikTok to engage students in a “Goodbye 2020” tribute. The lesson plan included a rubric requesting a summary of 2020 historical events and a personal statement on what to look forward to in 2021. The lesson plan did allow for student choice in the digital tool platform, only suggesting TikTok as a delivery method. The limitation to an adaptation phase of technology integration was the limited access to additional follow-up information or activities within the lesson plans.

Access to additional information was a limitation in all lesson plans as additional or extended learning was not addressed in any of the lesson plans submitted. As the Technology Integration Matrix's transformative phase includes ongoing access to information and expansion of knowledge, the submitted lesson plans did not include the information explicitly, so no indications of a transformative level of authenticity within the Technology Integration Matrix can be discussed.

### **Goal Directed**

In the final theme within the Technology Integration Matrix, having a goal-directed implementation includes using digital tools and technology to set goals, evaluate, and reflect on



results. Each lesson plan created a digital list of “required activities” delivered via a learning management system in the classroom. In 16 instances, using a prescribed digital tool provided feedback from the teacher or through the program itself in a digital manner. Examples included feedback on papers submitted through Google Drive, assessment scores as generated from an online program, and the use of an online grade book through Google or the school district student information system.

Two lesson plans, one at an elementary and one at a high school level, incorporated choice boards for students to complete asynchronously. These choice boards met the goal-direction adaptation level as the teacher created the choice board to include self-checks and reflections based on choices. In one example, the teacher indicated that if the score on one choice was below a certain percentage, then the next choice the student selects should be from the “green tiles,” which indicated a remediation tile from the previous concept.

One lesson plan shared the use of digital tools at a transformative level in a digital environment, directing students to conduct a video interview with a local representative regarding a political initiative of the students’ choice. Students were given the choice of political initiative, and the lesson plan indicates resources for students to reach out to schedule interviews and acquire additional information regarding the topics. The lesson plan did not stipulate the digital tool required for presentation and listed the intent of the lesson and activity to “share political items in our backyard with others and to promote action.”

The submitted lesson plans provided data to determine a perceived implementation of digital tools related to the Technology Integration Matrix. Still, additional data was limited by the depth of the lesson plans submitted. Data analysis was limited to what was explicitly

described in the lesson plans to avoid the assumption of activities' intent. None of the submitted lesson plans included a reflective component summarizing the effectiveness of implementation.

### **Summary**

The purpose of the case study was to discover how virtual learning influenced a professional development opportunity on the implementation of technology for teachers in a rural school district. The collection and analysis of participant interviews and lesson plans shared how the use of digital tools in a rural district can impact access, engagement, and build community among educators. Also, the participant interviews shed light on the necessity of technology and professional learning on technology due to a pandemic. Classroom implementation was observed by submitting lesson plans aligned to the Technology Integration Matrix and anecdotal statements in interviews on the application of the digital tools training in the classroom. The Technology Integration Matrix and the pre-determined themes established through interview questions provided a categorization method for how the virtual learning experience influenced a professional development opportunity.

## V. DISCUSSION

The purpose of this qualitative case study was to discover how a virtual learning opportunity using various digital tools influenced professional development for teachers in a rural school district. The discussion includes major findings related to the literature on the use of digital tools to support collaboration in virtual learning for teachers, including the perceived influence virtual training has on implementing digital tools to support learning in the classroom. Also included is a discussion on the connections of findings from this study to previous studies on digital learning as outlined in the literature review. Connections to Maslow's theory of self-motivation (1943) and Kearsley and Schneiderman's (1998) theory of engagement are also discussed. Finally, the chapter concludes with a summarization of the findings from the study conducted and a discussion on the study's limitations and areas of future research.

Access, engagement, implementation, and community were themes presented in Chapter IV through analysis of the data collected via interviews and submitted lesson plans. The analysis took place at two levels: (a) cross-case analysis of participant interviews and (b) cross-case analysis of submitted lesson plans aligned to the Technology Integration Matrix to discover emergent themes of teacher perceptions and implementation. Each level of analysis included a general comparison and organization of themes emerging from the data collected. The results included a narrative form and visual form through tables and charts to emphasize the narrative analysis themes.

The data presented in chapter IV was limited in scope as seven of the initial 17 volunteers in the study were unable to fulfill the requirement to submit lesson plans at the finale of the professional learning opportunity due to professional and personal obligations during the COVID-19 pandemic. The 10 participants who did submit both lesson plans and complete the interview via video conferencing were able to do so by using a learning management system and Microsoft Teams as time permitted outside of work hours. The data collected from both the interviews and lesson plans directly relate to the research questions in the study focusing on the perceived effectiveness of virtual professional learning opportunities and the use of digital tools to promote engagement in a virtual learning environment. The evidence of collaboration within lesson plans through digital tool use exhibited a transference of learned content from the provided professional learning to classroom use. At least one lesson submitted included a high-level implementation of digital tools in the classroom, which would meet the requirements for a transformative level implementation on the Technology Integration Matrix. Provided lesson plans also included multiple examples of digital tool use that mimicked the activity demonstrated within the professional learning experience. Through the interview process, participants shared insight into professional development needs, expressed concerns with a virtual learning environment, and highlighted key areas of engagement and implementation of learned content through information learned in the virtual learning experience.

### **Interpretations of the Findings**

Chapter V discusses the current and future use of digital tools for adult professional learning by providing insight into the following research questions:

1. What influence does the use of various digital tools have on the perceived effectiveness of professional development?

2. What are the perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development?

The first research question in the study focused on the influence of various digital tools on the perceived effectiveness of professional development. An analysis of participant-submitted lesson plans was conducted in comparison to the Technology Integration Matrix. The Technology Integration Matrix focuses on five characteristics of the learning environment: active, collaborative, constructive, authentic, and goal-directed use of technology. The use of technology in each given area is then categorized as entry, adoption, adaptation, infusion, or transformation level. In the study conducted, only the entry level, adaptation level, and transformation level were analyzed.

Areas of high implementation and room for growth within the Technology Integration Matrix were noted from the analysis of interview data and submitted lesson plans from research participants. Specifically, the Technology Integration Matrix's constructive category calls for digital tool use to build upon prior knowledge to be considered adaptive or transformative, and limited evidence of constructive use of digital tools was shown from participant submissions. The goal-directed category in the Technology Integration Matrix focuses on using digital tools to allow for student choice in the display of mastery of content. From the lesson plans submitted, goal-directed activities were submitted by multiple study participants. In submissions of lesson plans from the elementary to the high school level, study participants transferred a learned digital tool into a submitted lesson plan activity, encouraging students to utilize digital tools to display mastery using student choice of display. All collected data samples indicated the teachers shared at least an entry-level knowledge and application of authentic digital tools from the lesson plans

collected. However, the lessons submitted did not have additional data to support that the digital tools provided authenticity to the lesson as described in the Technology Integration Matrix.

According to the Technology Integration Matrix, data indicate that digital tools within a virtual professional learning experience translated into at least an entry-level classroom implementation of digital tools. Multiple lesson plans included the use of digital tools as part of a collaborative and goal-directed implementation of content. In addition, the evidence of implementation through lesson plans suggests the online training or professional development's perceived effectiveness through the transference of learned skills from the given training to submitted lesson plans. In contrast, limited evidence of transference of constructive or authentic learning through digital tools was evident in the collected data as student choice and application to real world scenarios were not addressed in the provided submissions.

Data collected from the submitted lesson plans and anecdotal information from the interviews align with Berry's (2015) study on digital tools to promote collaboration in virtual professional learning. In the current case study, effectiveness was exhibited most frequently in lesson plans focused on student collaboration using digital tools. The digital tool was presented as "authentic conversation starters" (participant 4) within the training, and the transfer to the classroom was evident in the lesson plans submitted. As participants in the professional learning experience had the opportunity to use digital tools to promote collaboration, the transfer to classroom application was evident within the lesson plans. Although Berry's (2015) study examined the positive impact of digital tools to prolong collaboration through discussion boards asynchronously, the current study also includes data to support the use of digital tools to promote synchronous, active collaboration opportunities in both professional learning and lesson plan submissions.

The four themes derived from participant interviews included access, engagement, implementation, and community. When relating the four emergent themes to the initial research question, the interview data indicate digital tools increased participant engagement throughout the professional learning opportunity. The data collected also align with Hunt-Barron's (2015) study on increased engagement through the use of digital tools in professional learning, specific to the use of Google Sites and Google Drive. Participants in the current study utilized the same digital tools to increase engagement, as indicated in submitted lesson plans and interview data.

The perceptions of teachers in a rural school district regarding virtual learning opportunities for professional development was the focus of the second research question. Research participants completed an interview via video conferencing tools to share perceptions on professional learning opportunities for adult learners. Four themes related to access, engagement, implementation, and community emerged from participant interviews. Additional insight into future use is discussed as participants completed the virtual professional learning opportunity during the COVID-19 pandemic.

Participant interviews included multiple references to the increased opportunity to remove travel and cost associations with professional development. The data collected via the interviews echoed Bryan's 2011 research on rural schools in South Africa with low participation rates in professional learning due to time, travel, and cost limitations. The implementation of a virtual learning opportunity offered in this case study provided an avenue to increase participation in professional development in a rural community by removing the barriers expressed by teachers. One of the main themes drawn from the participant interviews was access to professional learning.

A key finding was the broad definition of access among participants. While some participants defined access in a geographic framework, the discussion of access included access to additional content options in a virtual setting and the ease of physical access when removing the travel, cost, and time components. The initial intent of the research question focused on the limitation of access to face-to-face professional development due to geographical constraints; however, an additional implied definition of access from participants included access to digital tools and access to physical computer hardware. Although a review of access to digital tools as part of the research was not an initial intent of the study, the discussion was consistent throughout multiple interviews with participants sharing concern for access or use of the digital tool as a barrier to access to virtual professional learning. For example, Basilaida and Kvavadze (2020) discussed the limitations of access to Wi-Fi or digital tools and hardware related to the 2020 pandemic in their research. The case study presented here also took place during the 2020 COVID pandemic. To avoid the barriers described in Basilaida and Kvavadze's (2020) research, the professional learning opportunity setting in the current case study provided all needed tools and hardware as part of the training, removing the barrier of hardware and software access.

Teachers who expressed concerns for virtual learning also shared the highlights and changes to preconceived notions of virtual learning in the given interviews, sharing that the teachers appreciate the shortened time frames that allowed the opportunity to collaborate in a virtual setting. Almost all participants did note that a limitation of virtual professional learning was the opportunity to discuss topics in an informal format, as a virtual meeting did not include face-to-face breaks or non-scripted discussions. However, participants discussed that virtual learning does allow for the expansion of learning communities through social media and other global avenues. In contrast to Brauer's (2019) study presented on the limitations of collaboration



through online discussion boards for virtual learning, the current case study shared additional avenues to promote discussion through social media avenues and professional learning communities. Feelings of self-motivation similar to those discussed in Brauer's (2019) work were expressed in the current study through the ability to complete tasks in a self-paced environment with a specified task to complete to show mastery. Hamdan's (2015) study laid the foundation for the study presented here, stating that digital tools should not be used solely for functionality but also for collaboration and authentic learning. In the current study, participants exhibited the use of digital tools for collaboration and authentic learning in submitted lesson plans and in discussions in the interview process, which emphasizes Hamdan's (2015)-- research on the importance of digital tool use as part of collaboration and application.

Although the COVID-19 pandemic did provide a new landscape for the necessity of virtual learning, participants in the given case study shared the need for virtual learning opportunities for teachers beyond the landscape of a pandemic. The four themes present in the qualitative interviews are vital components for the future of virtual learning opportunities and must be addressed to increase the effectiveness and engagement of a virtual experience. First, a clear definition of access must be established, and the components of access must be addressed both individually and collectively to ensure that all facets are addressed. Second, engagement and implementation are key components of a virtual learning environment in professional development, as expressed through Kearsley and Schneiderman's (1998) theory of engagement. If participants are not engaged in the learning experience, then implementation of learned content will not occur. Finally, the opportunity to build a community of learners should be built into the learning opportunity, whether virtual, blended, or face to face, to increase effectiveness and

allow for sustained professional learning and outreach to reflect and share ideas with other members of the teaching profession.

### **Access**

Educators must have access to relevant professional learning opportunities. The access must be geographically reasonable, considering travel time, associated costs, relevance, and digital access to all programs, hardware, and technology infrastructure to provide a positive learning environment. Participant statements aligned with the study by Curran et. Al. (2006), listing time, cost, and distance as key factors limiting access to professional learning. Providing a virtual experience that can be accessed from anywhere was a given solution to the geographic and travel constraints but enhanced the importance of access to digital content, hardware, and programming. Participants in the case study shared that access to technology infrastructure and software must be provided before or within the professional development opportunity and as part of the environment that educators implement the learned content. Participant 9 emphasized the importance of ease of access and the need to be actively engaged: “to be engaged, I need to jump in without looking for my password and having to figure out the navigation to use the tools.” Participants must not spend the time allotted for a professional learning opportunity in navigating digital tools for functionality, but the participants should spend that time working with the digital tools for applications within the classroom. The case study also highlights that in addition to the need for opportunities for professional learning in rural school districts, as discussed in the Institute for Educational Sciences (2017) study on access to professional development in rural school districts, access must also be assessed from a technology standpoint. Access to hardware, software, and digital tools is important to removing the barriers to professional learning opportunities, even if travel and geography are no longer factors. Thornburg (2014) emphasized

the importance of selecting hardware and software as related to content, appropriateness, and the intended outcome, pointing out the hardware selection should be a consideration for school districts when deploying a virtual professional development model.

## **Engagement**

Engagement is one of the key factors in sustained enrollment and participation in a virtual learning opportunity (Brauer et al., 2019). Greenangel's (2016) study indicated a lack of engagement as the primary reason for exiting a virtual learning experience and served as a foundation for the current research. Although some participants in the case study noted a lack of hands-on or constructed activities in the virtual setting, all participants did note that the opportunity to collaborate with peers elevated engagement and participation in the virtual learning experience. Opportunities to collaborate provide an active environment that align with Johnson's (2018) study on engagement theory's basic principles of allowing for group context or collaborative teams, being project-based, and having authenticity. Participant 6 shared that professional learning is not the same experience as watching a television show. Virtual learning opportunities require "active engagement to learn something from the training, and you can't just sit down and listen like a nightly television show." Participants must be engaged in learning through collaboration and opportunities to share in order to maintain effectiveness as discussed in Gunther and Reeve's (2017) study showing that collaboration increases engagement and implementation .

## **Implementation in the Classroom**

The measure of implementation was related to lesson plans submitted by study participants. These lesson plans provided showed, at minimum, an entry-level model of digital tool integration, and in some instances also showed that a transformative implementation was

present. Notable in the provided lesson plans was the use of the same digital tools presented in the professional learning opportunity but modified for classroom implementation, such as Padlet and Edpuzzle. Participants shared an increased confidence in digital tools after experiencing them modeled in the virtual professional learning experience as the participants had opportunities to “collaborate and model with peers in the learning environment before utilizing it in the classroom” (Participant 3). The increased confidence with digital tools translated to the lesson plan submissions which showed more than three instances of the use of the modeled digital tools in the classroom for K-12 instruction. The evidence collected via lesson plans and teacher interviews aligns with the Bin-Jomman and Al-Khattabi (2018) study discussing how digital tools in professional learning experiences increase confidence and implementation in the classroom. The submitted lesson plans exhibited use of digital tools in the classroom setting as either a direct replication or a modification of the training provided in the study.

The current case study expanded upon Bin-Jomman, and Al-Khattabi’s (2018) study by modeling digital tools in a virtual environment instead of a face-to-face or blended environment and revealed the same results of increased engagement, implementation, and overall confidence with the use of technology. The increased engagement, as shared by the continued use of the discussion boards within the professional learning environment, allowed for the building of a strong professional learning community which was a key need as expressed in Parson’s (2019) study on educators’ professional development needs. Implementation was evident through lesson plan submissions which showed the use of digital tools to support teachers and students and also aligned with Hunt-Barron’s (2015) study to remove the barrier of access to digital tools for both teachers and students. Finally, increased confidence was evident in participant interviews as

expressed earlier by Participant three when referencing the shift from just receiving information to an interactive experience in virtual setting.

### **Building Community**

The final theme evidenced within the case study on digital tools in a virtual learning experience was the importance of building community in any professional learning format. The data collected showed that participants were more engaged as exhibited through interview responses from Participants moving from a “sit and get” (Participant three) to excitement in the ability to use digital tools such as breakout rooms (Participant six) and a sense of meaning when actively interacting with the content in a virtual experience. Providing opportunities to collaborate was a common theme within all interviews as participants discussed the various ways they were reaching out to other educators in a virtual environment. Participants were collaborating and joining online discussions using digital tools just to “hear what other teachers had to say, or suggestions they may have.” An expansion of Brauer’s (2019) study on the limitations of social media, participants indicated the use of social media was a new way to connect with others during the COVID-19 pandemic and through the use of technology.

The opportunities shared about building community in a digital platform also echo Nolan and Molla’s (2019) study that revealed how building a community to improve upon concepts and strategies was a key component of effective professional learning. The use of digital tools was encouraged through various opportunities in the professional learning opportunity to provide sustained access to the participants’ professional community in both a formal and informal platform. Participants did note limited unscripted collaboration or communication in a virtual learning experience as there was no open discussion opportunity, all interaction and engagement

was part of an activity with specific instructions. Still, participants found that virtual learning and digital tools provided additional outlets to gather information and share both ideas and other topics within the teaching community as evidenced by content in the professional learning discussion boards with discussions ranging over a period of 30 days. Participant three explicitly referenced the availability and engaging use of the digital tools presented in the professional learning as ways to collaborate with others in a digital environment.

The opportunity for extended discussion made available through the use of digital tools is important to foster sustained professional learning communities. The use of the discussion board is a controlled environment similar to the use of social media to continue learning. Ross et al.'s (2015) participant interviews indicated that social media such as Twitter played a key role in building a larger professional community. Although Twitter was not explicitly discussed within the case study's virtual learning experience, participant seven indicated that social media did play a key role in building a larger professional community saying, "it is the collaboration and conversation through Facebook (social media) that is holding us together right now." The importance of the professional community was commonly associated with the necessity of immediate information and collaboration as a result of the COVID-19 pandemic, which limited face-to-face interactions in K-12 education. As educators were looking for immediate support for the changing landscape of education during the pandemic, social media platforms and technology were vital to building a robust professional learning community both within the district and across the teaching profession. Just as participant seven indicated that they "would not have made it through this year" when referencing the importance of a professional learning community founded through social media, virtual professional learning opportunities also

provided targeted support for teachers. Accessibility in a digital format allows for immediate access on how to use digital tools in a K-12 environment in an ongoing format.

### **Implications for Social Change**

The COVID-19 pandemic changed how technology was used in K-12 school systems worldwide. In the past, technology was an optional tool that could be used to deliver information but was not the foundation of courses in K-12. Participants in the study indicated that although the use of digital tools to present information was found in their class before the pandemic, they are now using digital tools differently to enhance collaboration and understanding as a result of the pandemic. Participant three felt more confident in the use of digital tools even after the pandemic because the pandemic created a necessity for educators and students around the world to use technology to deliver content to students. In addition to teacher-to-student interactions, teachers needed to receive professional learning while limiting or altogether avoiding face-to-face interactions. The case study provides a timely interpretation of how to utilize digital tools to present effective professional learning opportunities that incorporate engaging and collaborative structures to relay content. Beyond the necessity of virtual learning during a pandemic, virtual professional learning provides access and opportunities for adult learning with less cost and travel time.

The ability to foster collaboration and engagement in virtual settings long-term was evident throughout the case study. As participants, the sample of educators in the study indicated that effective professional development should focus on access, engagement, implementation, relevance, and community and can be exhibited in multiple delivery models of professional learning, and the use of digital tools preserves the community and collaboration in a virtual learning environment. By providing access to a virtual learning environment, teachers can select

relevant professional learning opportunities and can learn strategies to implement technology in the classroom. The access to professional development and the self-selection of opportunities promote engagement and increase community building as participants share the same interests.

### **Limitations and Recommendations for Future Research**

The sample size of the population was limited to a single rural school district. In addition, due to the COVID-19 pandemic, all professional learning was transitioned to a virtual experience out of necessity, possibly limiting the scope of the case study to the current requirements needed to effectively implement virtual learning during a pandemic. Also, due to the limitation of face-to-face interactions, participants were not provided with a choice of delivery model for their professional learning.

Areas for future research may include a focus on demographic data to determine if various demographic markers play a factor in virtual learning perceptions. Demographic data was provided as part of the general demographics review but was not the current study's focus. In addition, a micro-credential or badge was not included as part of the study's virtual learning experience. Davie's (2015) study indicated that a micro-credential is a way to indicate mastery of a learned concept; however, the same study did not indicate whether participants were more invested or engaged in the learning opportunity because of an achievement badge available to the participants. A recommendation for future research is to determine if a micro-credential or badge supports additional participant engagement or sustained learning.

### **Recommendations for Action**

As school districts plan for professional learning opportunities, a blend of virtual and face-to-face offerings should be considered. The data collected through the interview process indicate that virtual professional learning incorporating digital tools can provide a collaborative



and engaging experience. However, the data also indicate the continued need for face-to-face opportunities to elicit conversations and discussions beyond the presented content. Additionally, virtual learning opportunities may increase the use of digital tools and the transfer of knowledge within the classroom, moving towards digital transformation as related to the Technology Integration Matrix.

### **Conclusion**

The qualitative case study on the perceived effectiveness of professional development using digital tools as a delivery model in a rural school district provided insight and considerations for future implementations of professional learning opportunities for educators. Although the COVID-19 pandemic forced participants to transition to a virtual learning delivery model, participant perceptions of a virtual professional learning experience and the implementation of the learning provided a meaningful look into the future applications of virtual learning for adult learners. Virtual professional learning provides an opportunity to increase access, maintain engagement, provide implementation strategies for classroom use, and provide alternate pathways to building a professional community. As opportunities for traditional face-to-face training are met with comparable virtual learning experiences, the shift to a virtual learning experience provides teachers with a choice in selecting a digital platform to receive professional development that is timely, relevant, and cost-efficient in the virtual setting or attend a face-to-face component.

Teacher perceptions of professional development did not change based on the format that the content is provided, whether it is a virtual, face-to-face, or blended delivery model. Regardless of the delivery model, teachers looked for relevant opportunities that built community and collaboration. The case study presented shows that a virtual professional

development opportunity can meet the needs of an educator while providing a cost-efficient, timely, on-demand experience. In addition, a virtual professional development opportunity increases perceived effectiveness and implementation of digital tools in a classroom setting as reviewed through the Technology Integration Matrix.

## REFERENCES

- Ann, D., & University of Lethbridge. (1999, January 1). The role of curriculum coordinators. Retrieved from <https://opus.uleth.ca/handle/10133/1006>
- Beach, Pamela. (2016). Self-directed online learning: A Theoretical Model for Understanding Elementary Teachers' Online Learning Experience. *Teaching and Teacher Education* 61 (60-72).
- Bernstein, L., & Larry. (2019, June 5). New Global Survey Offers Snapshot of Technology in the Classroom in 2019. Retrieved from <https://edtechmagazine.com/k12/article/2019/02/new-global-survey-offers-snapshot-technology-classroom-2019>
- Berry, B. (2015). The dynamic duo of professional learning = collaboration and technology. *Phi Delta Kappan*, 97(4), 51–55. <https://doi.org/10.1177/0031721715619920>
- Bill and Melinda Gates Foundation (2014). Teachers Know Best – Teachers' views on professional development. Retrieved from <https://s3.amazonaws.com/edtech-production/reports/Gates-PDMarketResearch-Dec5.pdf>
- Bin-Jomman, S. M., & Al-Khattabi, M. (2018). Measuring the Effect of Use Web 2.0 Technology on Saudi Students' Motivation to Learn in a Blended Learning Environment. *International Journal of Advanced Computer Science and Applications*, 9(7). doi: 10.14569/ijacsa.2018.090711
- Brauer, S., Korhonen, A., & Siklander, P. (2019) Online scaffolding in digital open badge-driven learning, *Educational Research*, 61:1, 53-69, DOI: [10.1080/00131881.2018.1562953](https://doi.org/10.1080/00131881.2018.1562953)

- Brown, R., Ernst, J., Clark, A., DeLuca, B., & Kelly, D. (2017). best practices: Technology education courses and classrooms naturally lend themselves to providing active learning opportunities for students. *Technology & Engineering Teacher*, 77(2), 30–34.
- Bryan, C. (2011). Professional development during a period of change: a small-scale case study exploring the effect of context on practice in a South African rural school. *Professional Development in Education*, 37(1), 131-141. doi: 10.1080/19415257.2010.499302
- Chesnokova, G., & Agavelyan, R. (2019). Modern context of teacher’s professional development in high school. *Proceedings of the Multidisciplinary Academic Conference*, 148–152.
- Croft, N., Dalton, A., & Grant, M. (2010). Overcoming isolation in distance learning: Building a learning community through time and space. *Journal for Education in the Built Environment*, 5(1), 27-64. doi: 10.11120/jebe.2010.05010027
- Darling-Hammond, L., Hyler, M. E., Gardner, M. (2017). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.
- Danielson, C. (2013). *Enhancing professional practice: A framework for teaching*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Davies, R., D. Randal, and R.E. West. (2015). “Using Open Badges to Certify Practicing Evaluators”. *American Journal of Evaluation*, 36 (151-163).
- De George-Walker, L., & Keefe, M. (2010). Self-determined blended learning: a case study of blended learning design. *Higher Education Research & Development*, 29(1), 1-13. doi: 10.1080/07294360903277380
- Fancera, Samuel F., (2020). School leadership for professional development: the role of social media and networks. *Professional Development in Education*, 46(4), 664-676.

Fleming, J., Becker, K., & Newton, C. (2017). Factors for successful e-learning: Does age matter? *Education & Training*, 59(1), 76-89.

doi:<http://dx.doi.org.seu.idm.oclc.org/10.1108/ET-07-2015-0057>

Florida Center for Instructional Technology. (2019) Technology Integration Matrix. Retrieved from <https://fcit.usf.edu/matrix/matrix/>

Gawron, Z. (2004). Adult learning and technology in working-class life. *Labour / Le Travail*, 54, 270–272. Retrieved from <https://doi-org.seu.idm.oclc.org/10.2307/25149518>

Gronseth, S. L., & Hutchins, H. M. (2020). Flexibility in Formal Workplace Learning: Technology Applications for Engagement through the Lens of Universal Design for Learning. *TechTrends: Linking Research & Practice to Improve Learning*, 64(2), 211–218. <https://doi-org.seu.idm.oclc.org/10.1007/s11528-019-00455-6>

Gunter, G. A., & Reeves, J. L. (2017). Online professional development embedded with mobile learning: An examination of teachers' attitudes, engagement and dispositions. *British Journal of Educational Technology*, 48(6), 1305–1317. <https://doi-org.seu.idm.oclc.org/10.1111/bjet.12490>

Horn, I. S., Garner, B., Kane, B. D., & Brasel, J. (2017). A taxonomy of instructional learning opportunities in teachers' workgroup conversations. *Journal of Teacher Education*, 68(1), 41+. Retrieved from <https://link-gale-com.seu.idm.oclc.org/apps/doc/A475125574/ITOF?u=southec&sid=ITOF&xid=7f3062a>

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Hunt-Barron, S., Tracy, K.N., Howell, E., & Kaminski, R. (2015) Obstacles to enhancing professional development with digital tools in rural landscapes. *Journal of Research in Rural Education*, 30(2), 1-14.

- James, F, Figaro-Henry, S. (2017) Building collective leadership capacity using collaborative twenty-first century digital tools, *School Leadership & Management*, 37:5, 520-536, DOI: [10.1080/13632434.2017.1367277](https://doi.org/10.1080/13632434.2017.1367277)
- Janakiraman, S., Watson, S. L., & Watson, W. R. (2018). Adult Learners Use of Self-Directed Learning Strategies in a Massive Open Online Course. , (2), 122–133.
- Kiryakova, G. (2019). Massive Open Online Courses - a Modern Form of Distance Education. *Trakia Journal of Sciences*, 17(Supplement 1), 909–913. <https://doi-org.seu.idm.oclc.org/10.15547/tjs.2019.s.01.150>
- Kearsley, G., & Shneiderman, B. (1998). Engagement Theory: A Framework for Technology-Based Teaching and Learning. *Educational Technology*, 38(5), 20-23. Retrieved from <http://www.jstor.org/stable/44428478>
- Kennard, Margaret Anne, "A Study of the Relationship between Teachers' Perceptions of Self-Actualization Needs and Their Perceptions of Satisfaction with the Teaching Profession" (1983). Dissertations. 2451. <https://scholarworks.wmich.edu/dissertations/2451>
- Lederman, D. (2018, November 7). Online education ascends. Retrieved from <https://www.insidehighered.com/digital-learning/article/2018/11/07/new-data-online-enrollments-grow-and-share-overall-enrollment>
- Leung, J. (2018). DISCOVERING UTILIZATION PATTERNS IN AN ONLINE K-12 TEACHER PROFESSIONAL DEVELOPMENT PLATFORM: Clustering and Data Visualization Methods. , (3), 17–37.
- Maslow, A. H. (1943). *A theory of human motivation*. United States: BN Publishing.
- Matherson, L., & Windle, T. M. (2017). What Do Teachers Want from Their Professional Development? Four Emerging Themes. *Delta Kappa Gamma Bulletin*, 83(3), 28–32.

- Maxwell, C. (2016, March 4). What blended learning is – and isn't. Retrieved from <https://www.blendedlearning.org/what-blended-learning-is-and-isnt/>
- Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *The Internet and Higher Education*, 18, 15-23. Retrieved from <https://doi.org/10.1016/j.iheduc.2012.12.001>.
- Nolan, A. and Molla, T. (2019) 'Supporting teacher professionalism through tailored professional learning'. *London Review of Education*, 17 (2): 126–140. DOI <https://doi.org/10.18546/LRE.17.2.03>
- Ngai, S., Cheung, C., Yuan, R. (2016) "Effects of vocational training on unemployed youths' work motivation and work engagement: Mediating roles of training adequacy and self-actualization." *Children and Youth Services Review* 63 (2016) 93-100.
- Parsons, S., Hutchison, A., Hall, L., Parsons, A., Ives, S., Leggett, A. (2019) "U.S. teachers' perceptions of online professional development." *Teaching and Teacher Education* 82 (2019) 33-42.
- Petola, P., Haynes, E., Clymer, L., McMillan, A., Williams, H., (2017) Opportunities for teacher professional development in Oklahoma rural and non-rural schools. National Center for Educational Evaluation and Regional Assistance, September. [www.ies.ed.gov](http://www.ies.ed.gov)
- Pusateri, Paul, "A Study of the Relationships between Self-actualization and Job Satisfaction in Teaching" (1976). Dissertations. 1526. [https://ecommons.luc.edu/luc\\_diss/1526](https://ecommons.luc.edu/luc_diss/1526)
- Reardon, R. F., & Brooks, A. K. (2008). Workplace learning in rural contexts. *New Directions for Adult & Continuing Education*, 117, 71–82. Retrieved from <https://doi-org.seu.idm.oclc.org/10.1002/ace.287>

- Rodesiler, L. (2017). Sustained Blogging About Teaching: Instructional Methods that Support Online Participation as Professional Development. *TechTrends: Linking Research & Practice to Improve Learning*, 61(4), 349–354. <https://doi-org.seu.idm.oclc.org/10.1007/s11528-017-0164-6>
- Ross, C. R., Maninger, R. M., LaPrairie, K. N., & Sullivan, S. (2015). The Use of Twitter in the Creation of Educational Professional Learning Opportunities. *Administrative Issues Journal: Education, Practice & Research*, 5(1), 55–76. <https://doi-org.seu.idm.oclc.org/10.5929/2015.5.1.7>
- Postholm, Cogent Education (2018), 5: 152278<https://doi.org/10.1080/2331186X.2018.1522781>
- Sandars, J. (2012). Technology and the delivery of the curriculum of the future: Opportunities and challenges. *Medical Teacher*, 34(7), 534–538. <https://doi-org.seu.idm.oclc.org/10.3109/0142159X.2012.671560>
- Schafer, N. (2020, March). ESSENTIAL TECHNOLOGY FOR PROJECT-BASED LEARNING: Here are digital classroom tools to help support project-based learning. *Tech & Learning*, 40(7), 24+. Retrieved from <https://link-gale-com.seu.idm.oclc.org/apps/doc/A618661621/CDB?u=southecc&sid=CDB&xid=3169cbdf>
- Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: online learning and communities of practice. *Distance Education*, 25(1), 107–123. Retrieved from <https://doi-org.seu.idm.oclc.org/10.1080/0158791042000212486>
- Stone, A. (2017, May 24). The rise of the online higher education leader. *Center for Digital Education* Retrieved from <https://www.govtech.com/education/higher-ed/The-Rise-of-the-Online-Higher-Education-Leader.html>



- Tipton, D. B., & Tiemann, K. A. (1993). Using the feature film to facilitate sociological thinking. *Teaching Sociology*, 21, 187–191.
- Vaughn, S. (1995). Meaningful professional development in accommodating students with disabilities lessons learned. *Remedial and Special Education*, 16(6), 344–353. Retrieved from <https://doi.org/10.1177/074193259501600604>
- Virtual Engagement, n.d. Retrieved from <https://www.smsu.edu/campuslife/civicengagement/types/virtual-engagement.html>
- Wang, D., Wang, J., Li, H., & Li, L. (2017). School context and instructional capacity: A comparative study of professional learning communities in rural and urban schools in China. , 1–9. <https://doi-org.seu.idm.oclc.org/10.1016/j.ijedudev.2016.10.009>

## APPENDICES

## Appendix A











### Interview Questions

1. Do you feel that living in a rural district with geographical challenges has limited your professional learning opportunities? (RQ2)
2. How does a virtual learning format for professional development impact your willingness to participate and engage in the content? (RQ1)
3. How do you feel about professional learning opportunities that take place independently completely online? (RQ2)
4. How do you feel about the use of digital tools to engage participants in professional learning activities? (RQ1)
5. What are the items you look for when selecting professional learning opportunities? (RQ1)
6. How familiar are you with a virtual learning model using a learning management system such as Canvas? If familiar, how would you describe your experiences so far? Do you feel that certain digital tools create a more engaging learning experience? (baseline to determine bias of technology use)
7. What do you think the limitations of online professional learning are? (RQ2)
8. How important is it to build a professional community or network from within and outside your building site? (RQ1)
9. How important is a sustained professional learning experience? Why or why not? (RQ1)
10. Do you feel that the use of digital tools (WEB 2.0/3.0) created a more engaging professional learning experience? (RQ1)

11. Do you feel that the use of digital tools created an environment of collaboration with colleagues and presented the opportunity to create an effective virtual learning experience? (RQ1)

## Appendix B

### Technology Integration Matrix – Florida Council for Instructional Technology 2021.

<div> <div>→</div> <div>LEVELS OF TECHNOLOGY INTEGRATION</div> </div>	 <div>ENTRY LEVEL</div> <p>The teacher begins to use technology tools to deliver curriculum content to students.</p>	 <div>ADOPTION LEVEL</div> <p>The teacher directs students in the conventional and procedural use of technology tools.</p>	 <div>ADAPTATION LEVEL</div> <p>The teacher facilitates the students' exploration and independent use of technology tools.</p>	 <div>INFUSION LEVEL</div> <p>The teacher provides the learning context and the students choose the technology tools.</p>	 <div>TRANSFORMATION LEVEL</div> <p>The teacher encourages the innovative use of technology tools to facilitate higher-order learning activities that may not be possible without the use of technology.</p>
	<div>↓</div> <div>CHARACTERISTICS OF THE LEARNING ENVIRONMENT</div>				
 <div>ACTIVE LEARNING</div> <p>Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.</p>	<div>Active Entry</div> <p>Information passively received</p>	<div>Active Adoption</div> <p>Conventional, procedural use of tools</p>	<div>Active Adaptation</div> <p>Conventional independent use of tools; some student choice and exploration</p>	<div>Active Infusion</div> <p>Choice of tools and regular, self-directed use</p>	<div>Active Transformation</div> <p>Extensive and unconventional use of tools</p>
 <div>COLLABORATIVE LEARNING</div> <p>Students use technology tools to collaborate with others rather than working individually at all times.</p>	<div>Collaborative Entry</div> <p>Individual student use of technology tools</p>	<div>Collaborative Adoption</div> <p>Collaborative use of tools in conventional ways</p>	<div>Collaborative Adaptation</div> <p>Collaborative use of tools; some student choice and exploration</p>	<div>Collaborative Infusion</div> <p>Choice of tools and regular use for collaboration</p>	<div>Collaborative Transformation</div> <p>Collaboration with peers, outside experts, and others in ways that may not be possible without technology</p>
 <div>CONSTRUCTIVE LEARNING</div> <p>Students use technology tools to connect new information to their prior knowledge rather than to passively receive information.</p>	<div>Constructive Entry</div> <p>Information delivered to students</p>	<div>Constructive Adoption</div> <p>Guided, conventional use for building knowledge</p>	<div>Constructive Adaptation</div> <p>Independent use for building knowledge; some student choice and exploration</p>	<div>Constructive Infusion</div> <p>Choice and regular use for building knowledge</p>	<div>Constructive Transformation</div> <p>Extensive and unconventional use of technology tools to build knowledge</p>
 <div>AUTHENTIC LEARNING</div> <p>Students use technology tools to link learning activities to the world beyond the instructional setting rather than working on decontextualized assignments.</p>	<div>Authentic Entry</div> <p>Technology use unrelated to the world outside of the instructional setting</p>	<div>Authentic Adoption</div> <p>Guided use in activities with some meaningful context</p>	<div>Authentic Adaptation</div> <p>Independent use in activities connected to students' lives; some student choice and exploration</p>	<div>Authentic Infusion</div> <p>Choice of tools and regular use in meaningful activities</p>	<div>Authentic Transformation</div> <p>Innovative use for higher-order learning activities connected to the world beyond the instructional setting</p>
 <div>GOAL-DIRECTED LEARNING</div> <p>Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.</p>	<div>Goal-Directed Entry</div> <p>Directions given; step-by-step task monitoring</p>	<div>Goal-Directed Adoption</div> <p>Conventional and procedural use of tools to plan or monitor</p>	<div>Goal-Directed Adaptation</div> <p>Purposeful use of tools to plan and monitor; some student choice and exploration</p>	<div>Goal-Directed Infusion</div> <p>Flexible and seamless use of tools to plan and monitor</p>	<div>Goal-Directed Transformation</div> <p>Extensive and higher-order use of tools to plan and monitor</p>