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Flattening the Curve: Elements Impacting K-12 Teachers' Technology Self-Efficacy with Distance Learning During COVID-19

Rochelle Stanley
Gardner-Webb University, rstanley3@gardner-webb.edu

FLATTENING THE CURVE: ELEMENTS IMPACTING K-12 TEACHERS' TECHNOLOGY
SELF-EFFICACY WITH DISTANCE LEARNING DURING COVID-19

By
Rochelle D. Stanley

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Approval Page

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_____   _____
Katherine Propst, EdD   Date
Committee Chair

_____   _____
Jennifer Putnam, EdD   Date
Committee Member

_____   _____
LaShanda Foust, EdD   Date
Committee Member

_____   _____
Jonathan Pullin, EdD   Date
Committee Member

_____   _____
Prince Bull, PhD   Date
Dean of the College of Education

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Abstract

FLATTENING THE CURVE: ELEMENTS IMPACTING K-12 TEACHERS'
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The purpose of this research study was to examine the elements impacting K-12 teachers'
technology self-efficacy while implementing distance learning during a global crisis,
specifically the COVID-19 pandemic. Through this examination, the gaps in teachers'
technology self-efficacy and learning opportunities may give teachers the assistance
needed to hone skills that will enrich student learning within distance learning platforms.
It will also provide insight for teacher education programs; school districts; and more
specifically, teacher organizations within communities.

> *Keywords:* COVID-19, distance learning, hybrid learning, self-efficacy,
technology efficacy, professional development

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Chapter 1: Introduction

Holistically, much has not changed in the K-12 educational arena. Prior to the 20th century, the tasks of an average K-12 teacher typically included researching content, preparing lesson plans for their content, delivering the content, grading student work, managing classroom materials, navigating the curriculum for the term, collaborating with staff, maintaining paperwork, supporting students and peers; as well as self-care and home life (Rojo-Ramos et al., 2020). Teachers are expected to engage the learner during the process; some of those experiences may or may not produce the anticipated outcome (Clapper, 2009).

Technology

Technology has been weaving into our day-to-day lives for over 4 decades, and one could expect the classroom teacher to be among the many threads to ensure learning is happening with this tool (Kitchenham, 2006). Many states began to implement technology learning standards into their school curriculum. In 2013, North Carolina passed a bill requiring the State Board of Education to create digital teaching and learning competencies. These standards would be the framework for schools of education, school administrators, and classroom teachers to implement high-quality, integrated digital teaching and learning (North Carolina Digital-Age Learning Initiative, 2020). In 2016, the State Board of Education approved the technology competencies informed by the International Society for Technology in Education (ISTE, 2021). Technology integration has become a dynamic opportunity for teachers to provide 21st century experiences within the classroom. However, with the implementation of the competencies, teachers must learn to balance content, pedagogical strategies, and technological resources while

acquiring the necessary competencies to improve their practice for evaluation purposes

(North Carolina Department of Public Instruction [NCDPI], 2013). The North Carolina

Digital Learning Standards include the following:

- digital citizenship, data privacy, and cyber safety

- digital-aged skills that permit students to become college and career ready

- creation of collaboration, communication, and critical thinking skills

- inquiry and design thinking learning opportunities

These competencies are designed to be used in the classroom across all content areas and

grade levels to give students learning opportunities in classrooms that are digitally

enhanced (NCDPI, 2013). Teachers collaborating with library media coordinators and

instructional technology facilitators will be a critical part of the equation as instruction is

delivered. As a result, the North Carolina Professional Standards for teachers were

revised, and additional professional development became necessary for those needing to

meet the digital competencies before the renewal of their professional license.

Schools Shut Down

Under normal circumstances, technology integration and acquiring the needed

competencies through professional development might appear a minor issue for those

looking outside. However, in late 2019, everything normal would cease to exist as the

COVID-19 virus spread globally and disrupted the educational system (Centers for

Disease Control and Prevention, 2020). When the virus arrived in the United States, it

was instrumental for businesses and cities to shut down and implement mask mandates.

On March 13, 2020, school districts in North Carolina (North Carolina Department of

Health and Human Services, 2022) were making plans in anticipation of a potential

closure for a week or 2. However, on March 14, 2020, in North Carolina, Governor Cooper announced a statewide mandate to close all K-12 schools, universities, and businesses to institute a shelter-in-place order for all citizens (North Carolina Department of Health and Human Services, 2022). Surrounding states followed suit by shutting down businesses and schools as the virus cases increased (Hawley, 2021). Students began to receive instruction via distance learning, and teachers were expected to execute these lessons in an engaging manner. Globally, there was an increase in online learning software, video conferencing, and tutoring use. Partnerships between school districts and media organizations began to emerge. Even celebrity athletes, like footballer Sergio Aguero in the United Kingdom, were being recruited or volunteered to teach content to engage students (Li & Lalani, 2020).

According to the Organisation for Economic Co-operation and Development (OECD, 2020), the immediate implementation of school shutdowns impacted stakeholders, specifically vulnerable students, in various ways depending on their connectedness to technology prior to the pandemic outbreak. The COVID-19 shutdown highlighted the disparities that had been existing throughout the school districts across socioeconomic and racial lines for decades (Economic Policy Institute, 2020). These disparities included Wi-Fi access, low-income families, school meal availability, single-parent homes, special education needs, physical learning opportunities, as well as social-emotional needs (OECD, 2020). Some school districts could not provide electronic devices to all students, or students did not have access to wireless connections for their devices in their homes or rural communities, so they were given paper packets or sent roving school buses with Wi-Fi hotspots. The same held true for some teachers, which

became an initial obstacle when they could not return to their school buildings as time was not available for quality instructional tools, which had not been created for this widespread deployment (Economic Policy Institute, 2020). The primary concern for teachers was converting their in-class lessons into effective distance learning lessons without adequate resources, prior technology training, state testing, and the duration of the unknown (Economic Policy Institute, 2020).

As the cases of COVID-19 increased across the world and in North Carolina communities, so did the level of frustration for teachers and other stakeholders impacted by the school closures (Gadermann et al., 2021). Parents became teachers by proxy for their children. Although their involvement is traditionally important, this role was unfamiliar (Borup & Evmenova, 2019; Garbe et al., 2020). Gadermann et al., (2021) stated that teachers, students, and parents encountered struggles initially with limited support. Student absences increased as their motivation in the distance learning environment decreased, which impacted the motivation of their frustrated teachers, who may not have been technologically prepared for this moment in time (Gadermann et al., 2021). Garbe et al.,2020) asserted that some parents embraced the time to connect with their children, while others found it difficult to maintain the schedule of remote learning.

Community Collaboration

Educational institutions, organizations, and companies started offering free online services and support to teachers (Shahzad et al., 2021). Social media communities began to emerge and to collaborate in larger numbers to share online lessons, ideas, and support to teachers struggling with distance learning. Facebook and Instagram experienced a significant usage increase. Prior to the COVID-19 outbreak, teachers gathered on

Facebook groups as means of support to battle wages and funding increases. However, those groups became a haven for crucial sources of educational news and distance learning resources (Hagerty, 2020; Loren, 2020). There were many veteran teachers and even beginning teachers who did not embrace the online platform due to the lack of exposure during their preservice training or a lack of confidence during professional development opportunities (Lipscombe et al., 2020). Pivoting to online learning when the school closures in Kentucky, North Carolina, and other states were extended to the close of the school year made the social media groups even more important. In Arizona, teachers connected weekly to share information on closures and political activity. While in Los Angeles, a group was formed to share resources for finding meals and supplies for families in need. Given the stressful period, every connection was not of a serious nature because many would share memes, jokes, and viral videos as comic relief. Facebook groups, as well as Instagram and Tik Tok posts by teachers, were especially important for teacher vaccine appointment information and as schools began to reopen implementing hybrid learning (Hagerty, 2020; NBC New York, 2021).

Schools Reopen

During the school reopening process, some districts, including some in North Carolina, opted for a gradual return to the classroom for students in response to the reduced spread of COVID-19. State leaders in North Carolina implemented rotational plans to reduce the number of students in a classroom at any time. These plans were named Plan A, Plan B, and Plan C. Smaller groups of students were placed in a group to assist with social distancing and were allowed to attend school by alternating weeks or days (Afacan et al., 2021).

As educators attempted to carry out innovation during the COVID-19 situation, they tended to utilize their own encounters and information to drive their inspiration to integrate technology. Uluyol and Şahin (2016) characterized outward and inborn inspiration concerning the utilization of innovation by explaining, "extrinsic barriers include a lack of resources, insufficient technical support, lack of time and inadequate training, intrinsic barriers include teachers' beliefs, attitudes, and views about knowledge, learning, and teaching" (p.70). Professional development for teachers is often the most used intervention to help impact student learners in their classrooms (McKeown et al., 2018).

McKeown et al. (2018) asserted that many researchers believe in the importance of professional development and the need for teacher input within this process. Districts, educational companies, and teacher organizations offer technology professional development for teachers with varying qualities; therefore, the anticipated gains may not reach the desired outcomes (Klein, 2021). Klein (2021) stated that pitfalls existed with professional technology development for decades, which became evident during the 2020-2021 school year. These pitfalls included teachers being given too many technology tools to learn, the one-shot professional development session on the tools, teacher learning needs being different, the inability to determine student outcomes, the lack of teacher voice, the lack of teacher choice, and discounting teacher fatigue during the COVID-19 pandemic. One thing to come out of the pandemic is the rethinking of professional development priorities and strategies for training teachers (Klein, 2021). The shortfall in utilizing technology effectively may rely upon the absence of teacher ability (Norton et al., 2000). Even though the equipment and programming are accessible,

numerous instructors lean toward known practices (Hughes, 1997). In numerous schools, educators depend intensely on course books, giving close to no thought to student needs (Okojie, 2011). Teachers are currently needed to convey clear guidance, possess technology abilities, be content experts, training researchers, and professional development participants (Klein, 2021; Okojie, 2011).

Statement of the Problem

Teachers being inadequately prepared, not having enough effective professional development as well as support with distance and hybrid learning, is problematic for all stakeholders, especially during a global pandemic (Schmitz et al., 2022). Due to the pandemic, teachers were challenged to provide student-centered learning experiences quickly when students in rural areas or economically distressed homes could not access devices or broadband (Trebian, 2019). Teachers also needed to provide effective feedback; however, if they were not trained to apply technology in this manner, this was an additional challenge to overcome (Schmitz et al., 2022). All stakeholders are impacted if communication is limited (Trebian, 2019).

Many classroom teachers lacked effective technology self-efficacy when implementing distance learning courses in their content area, which surfaced prominently during the COVID-19 pandemic (Schmitz et al., 2022). Prior to the pandemic, due to the lack of exposure to various technology, time, or ongoing support, several teachers had not incorporated technology into their daily lessons when they were not intrinsically motivated to do so (Guzey & Roehrig, 2012). When school buildings across the world stopped operating and students were required to learn from home, inquiries from teachers about the operation of online tools to secure complete lesson plans across various social

media sites and personal/professional learning networks flooded those platforms (Schmitz et al., 2022). Preservice and in-service professional development training may be insufficient to serve the needs of teachers, and therefore, the students they serve may not receive the level of education expected. In 1999, teachers received approximately 6 hours of quality technology training, which has not significantly increased (Zweig & Stafford, 2016). Some schools provided online courses for teachers to help them, but some teachers left the profession. The reasons varied from being intimidated by the distance learning platforms to the pressures asserted by administration, parents, students, and the community. In North Carolina, the focus on digital learning for teachers did not emerge until legislation passed to link technology to teacher licensure in 2013 (NCDPI, 2013). For the long-term memory to acquire new information, there were three steps: encoding, storage, and retrieval. With those steps, the most effective strategies for students were retrieval practice and distributed practice. Essentially, students and teachers learn in various ways, which were not addressed effectively during the pandemic by school districts or teacher organizations. These memory issues did not help to serve students in distance learning platforms (Zweig & Stafford, 2016).

Benefits of Teaching Online

Teacher expectations for technology use in the classroom extend beyond supporting lecture-based instruction (Sadaf et al., 2015). Applying technology to transform thinking, content, and outcomes does not appear in the data from classroom observations in most classrooms worldwide. OECD published the most extensive study ever conducted on digital learning in 2015, which evaluated technology integration and the international PISA exam scores for 15-year-olds in more than 30 countries, including

the United States (Redmond et al., 2018). The report did not indicate significant

achievements in reading, math, or science, even though these countries had a significant

monetary investment in information and communication technologies for education

(Redmond et al., 2018).

In North Carolina, according to the report, growth did occur over time for middle

grade students in immersion schools, and there was a significant percentage increase for

economically challenged learners in some immersion schools. Overall, results were

mixed because of how digital devices are used at any given time. The North Carolina

General Assembly passed a policy requiring the State Board of Education to create digital

competencies for educators (Redmond et al., 2018). These technology competencies are

required for license renewal, and professional development sessions were developed to

help teachers acquire the needed skills. However, the increasingly widespread use of

social networking sites impacts pedagogy and student learning due to its popularity. Its

effectiveness improves student learning, implementation strategies, social impacts, and

common uses to shape the direction of the field.

Challenges of Teaching Online

In a normal situation, teaching the curriculum in the classroom is the primary

goal, as it is the tool by which students can learn in an engaging manner. Integrating

technology partially or fully into a curriculum for learning experiences has been the path

for many scholars as the goal of creating 21st century citizens who use technology

effectively has increased over the decades (Martin & Sorensen, 2020). It has, however,

encountered challenges like the issue of privacy and access. Agapiou (2020) stated that

some teacher unions were against issues of teleconferencing for online learning

programs. The teachers in the union felt strongly that any voice recording or video recording in a classroom was a violation of the privacy rights of both the student and the instructor. Siddiqui and Singh (2016) also relayed that social media in education held privacy issues like posting personal information or inappropriate information. Additionally, they found the negatives of social media with students losing their ability to interact in a face-to-face situation and being distracted in the classroom. The transition from face-to-face to online learning in some school districts was challenging as most districts failed to access adequate educational technologies, making it necessary to send home packets of paper lessons (Strauss, 2020). Strauss (2020) stated,

> It is estimated that up to 12 million students - and some of their teachers – don't have access to the internet at home, and many of the 13 000 U.S. school districts don't have the resources to provide what is needed without outside help. Rural areas are tough to hit, as are high poverty areas, while schools and families struggle to keep up with learning programs with school buildings closed and students at home. The digital divide is not new, but the crisis facing the country has revealed how deep and damaging it is. (p. 5)

Even with internet providers offering free connectivity for 6 months and buses with Wi-Fi going into some rural areas, the inequity will only increase as schools transition to remote learning during the pandemic and suspend in-person classes (Strauss, 2020).

The COVID-19 pandemic highlighted areas where many schools encountered deficits, especially with teachers and technology proficiency due to some teachers being technophobes (Carpenter, 2021). Carpenter (2021) also wrote that a Kansas district instructional coach knew good professional development would have helped the teachers;

however, he was keenly aware that the training was not available to them. Additionally, he conveyed that while millennials were comfortable using technology, the more experienced teacher often found technology to be a time burden to acquire the needed new skill. Essentially, not all teachers were prepared to bring their content into online environments in the same manner as their classrooms, while others lacked the capacity or confidence to interact with technology effectively (Graves & Bowers, 2018). High percentages of schools did not have policies and platforms built around online learning, especially in rural areas. For instance, Kentucky teachers found their Facebook groups to be crucial when the new experience of distance learning emerged (Hagerty, 2020). High percentages of teachers also had not been trained for distance learning and were uncomfortable teaching online (Donnelly, 2020). The learning curve or the rate a person can gain the ability to acquire a new experience or skill will vary depending on their self-efficacy (Ritter et al., 2022). When the curve is steep, the learner has trouble or obstacles that demand significant effort (Redmond et al., 2018). On the other end is the shallow or flat learning curve, whereby the learning rate is quicker (Redmond et al., 2018).

According to Hu et al. (2021), teaching online has two issues. The main issue is the learners' overreliance on the computer tool to fix problems to their companions' criticism. They even copied companions' work instead of building their own thoughts, which could thwart learners' composing abilities and cause unfavorable consequences for their future academic composition. With the other issue, a few learners did not feel comfortable with the collective use of technology since they thought others were trying to get their information to compose an article. Past research aligns with the finding that students who have not completed work are hesitant to share their articles with other

people, or alter others' work, which could be viewed as possibly hostile conduct (Parker & Chao, 2007).

The COVID-19 pandemic prompted a dire need for professional development to help educators advance across hybrid and computerized settings. Jocius et al. (2022) posited that studies of virtual experiences have shown that fully online or hybrid models can effectively support educators' essential practice and develop close bonds with colleagues. However, experts caution that while virtual experiences can be successful means for building and supporting thriving professional communities, caution needs to be considered with hierarchical educational structures. A large part of the power of virtual learning comes from change (Jocius et al., 2022).

Social Networks

The use of social networking technologies will shape the facilitation of education and is part of the shift to distance learning environments as we seek an understanding of how teachers and students interact (Askari & Greenhow, 2015). Social networking sites have been integrated into educational systems as materials to teach, in addition to being tools to receive feedback. One of the advantages of using social networking technology seems to be its connectivity among students, teachers, and disciplines. At the college level, Siddiqui and Singh (2016) asserted that students using social networks, communication tools, or online exams as collaboration played a significant role in enhancing their knowledge. Their research also revealed that students might engage in a consistent manner on social media when teachers post assignments or school events. At the K-12 level, Martin and Sorensen (2020) conveyed that the use of Tik Tok to deliver content like math was less challenging and a more creative means to engage students than

video conferencing. In a study that analyzed research publications about web 2.0 during 2000–2019, the data revealed more use and contribution of web 2.0 tools from the United States than in other countries due to lack of awareness, computers being unavailable, and the lack of internet facilities (Baskaran, 2019).

Technology Tools

Technology tools such as Google Docs, a cloud-based instrument, permit learners to cooperatively alter and change content and give feedback to other learners (Hu et al., 2021). The model for teaching writing, as a rule, began with a short exercise covering a subject before learners composed separately or in groups with the utilization of Google Docs, after which learners shared their own work with others. So, Google Docs gives effective cloud-based conditions for composing (Elola & Oskoz, 2010; Hu et al., 2021). Elola and Oskoz (2010) showed that first, peer collaboration and input helped learners improve with peer mindfulness, which aligns with writing execution. Second, they found educators could unbiasedly review learners' work and group interests depending on the history highlights of Google Docs, for example, time and content. Third, learners' revising abilities could be upgraded as it is simple for instructors to place constructive feedback on them by explaining sentence structure, spelling, and content.

Theoretical Framework

The present study is rooted in the theoretical framework of andragogy learning theory, which incorporates each of the constructs explored in the study. Inquiry into Knowles's (1980) seminal research has adults employing internal motivation, relevance, interest, and experience which guides this study regarding the elements impacting teachers' technology self-efficacy with distance and hybrid learning during the COVID

pandemic (Knowles et al., 2005).

Before teaching content integrated with technology to children, teachers and stakeholders will need to know the best practices for teachers to acquire this knowledge. While andragogy theory is one of several models for adult education, this theory addresses the adult learning principles (Figure 1) with the assumptions made by Knowles in 1984, which are fundamentally different from pedagogy, as it addresses the learning of children and not adults (Knowles et al., 2005). Andragogy or adult learning is self-directed, task-oriented, relevant, and experienced-based. Educators often teach as they were taught, which may not align with the andragogy theory, but they should approach their role intentionally and critically. Adults are complex beings existing in a complex world that cannot be constrained to archaic learning approaches, which may lead to failure. Through the application of Knowles's principles, learners have the ability to tap into their experiences and think critically about a relevant task to make meaning of it in a self-directed manner as they retain the latest information (Glowacki-Dudka, 2019).

Figure 1

Andragogy Model
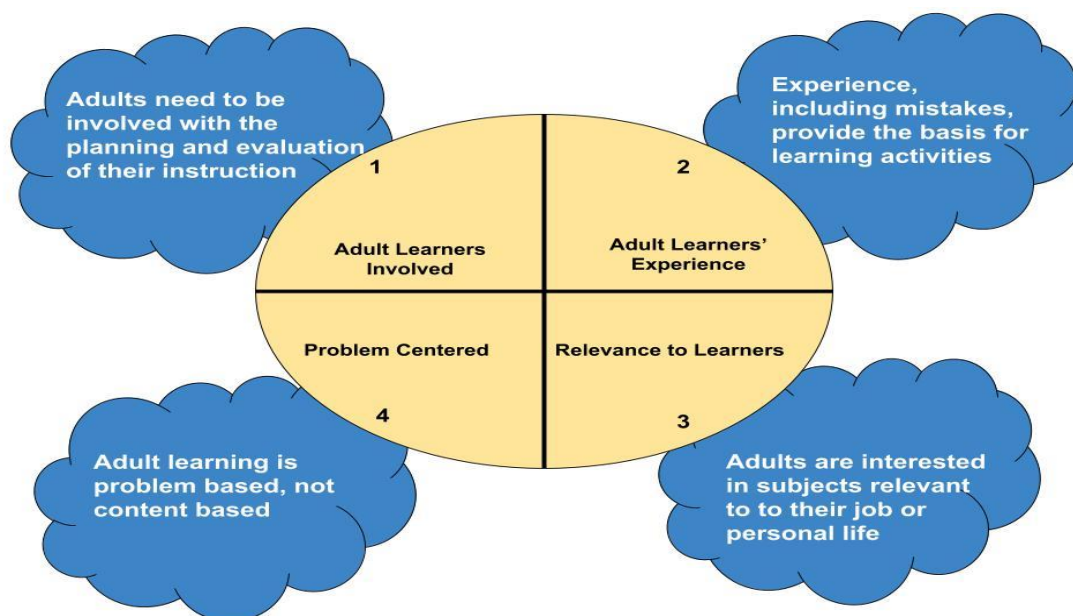
Note. Andragogy model.

Teacher professional development was designed to increase teacher knowledge

and skills about teaching, content, and learning. As the community's concern for student

success increased, so did the need for professional development in school systems (Pina,

2019). However, due to design flaws and implementation, the inconsistent

communication with districts, the community, and parents caused a negative perception

among these adult learners (Pina, 2019). Typically, professional development consists of

the adult learner listening to experts to receive information without engaging in the

process, implementation, or evaluation of the learning activities, according to Pina

(2019), which leads to negative perceptions by teachers. Applying the andragogy theory

to the learner's learning process and its application within professional development

would positively impact the adult learner. The positive impact found used the

andragogical model, the andragogical process, and the andragogical practice to address the teacher learner perceptions of professional development by applying action research. As a facilitator, Pina collaborated with learners over three cycles using an open-ended questionnaire. Results supported the intent to show Knowles's andragogy framework as an effective means of transforming professional development perceptions because it provided teacher agency.

Technology integration for teachers during their preservice and clinical educational experience can be seen as challenging when higher education institutions and their faculty are unable to provide the support needed to meet the requirements of 21st century learners. If institutions apply the andragogy framework within their students' learning journey, it may benefit all stakeholders, especially during a global crisis (Scott, 2019).

Purpose of the Study

The purpose of this mixed methods research study was to examine the elements impacting K-12 teachers' technology self-efficacy while implementing distance and hybrid learning during a crisis, the COVID-19 pandemic, using a diverse teacher organization (Sadaf et al., 2015; Slutsky, 2016). Through this examination, the gaps in preservice and in-service professional learning opportunities may help give teachers the assistance needed to hone skills that will enrich their skillset and improve student learning in any learning environment, specifically when placed in a distance or hybrid learning platform during COVID-19. While preservice teachers are proficient with social and communication technology tools, Sadaf et al. (2015) asserted that teachers were not as prepared to integrate new technologies into their classrooms despite their intentions to

do so.

This study may help to give insight into teacher education program experiences and professional development offered by school districts and teacher organizations in a community like the Regional Institute for Support of Teachers (RIST, a pseudonym) as they develop their future programming focused on enhancing the knowledge and learning experiences for the teachers they serve.

Professional development training is the primary tool for school districts worldwide for improving teacher skills and expanding teacher knowledge; however, no single training model has been deemed effective for all adult learners as most rely on presenters giving information with little interaction from participants (Pina, 2019). Studies on professional development have considered the adult education model and its necessity, while the consistency of enhancing 21st century skills throughout a teacher's career seems to be lacking worldwide (Knowles et al., 2005; Matherson & Windle, 2017; Pina, 2019). The integration of the andragogical process into professional development, according to Pina (2019), suggests the elements are required for effective learning to happen.

Research Questions

This study answered the following research questions:

1. What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?

2. What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?

Study Site

This study occurred within a professional learning organization of teachers that I call RIST for anonymity purposes. The organization was established to support teachers in an urban city in the United States within the southeast region. The RIST participants are at the center of a nonprofit teachers' leadership organization located in a large urban southeastern city. The organization serves approximately 400 K-12 highly qualified teacher members teaching in private, public, or charter schools. RIST was established to provide leadership opportunities and enhance professional expertise through training workshops to promote the retention of these effective educators. I selected this organization due to its diverse membership in one local southern region, the professional development support provided to teachers, and its overall contribution to the educational community.

RIST embraces its teacher members with support not usually seen in school districts to keep them in the teaching profession and the community. The organization's board and executive director granted permission for the study to take place because they desire to enhance their programming and serve their members better, which will impact the students within this region. A current member must nominate a teacher, and then the nominated teacher is invited to apply to become a member. The teacher candidate must have demonstrated their commitment to education and their students by their involvement within the school community and the community in the surrounding area. Following the application process, if accepted, they join the *new class* for a week of intense professional development and collaboration with their peers. Professional development is an ongoing tool implemented within the organization's programming offered to members.

Role of the Researcher

As a teacher in an urban school district in the southeast region of the United States, I have been a member of RIST for more than a decade. I was allowed access to this diverse group of educators and an organization that gives a varying level of support to retain them in the educational community.

When the COVID-19 pandemic impacted the world, RIST reacted with a series of professional development opportunities to assist teacher members with distance learning and student engagement. This series was implemented with the teacher's voice in mind because members were surveyed about their current needs, which led to this exploration of adult learning and teacher technology efficacy.

Overview of Methodology

This mixed methods study collected the quantitative data following an emailed electronic survey to the members of the RIST organization. The email invited each RIST member from the region's public, private, and charter schools to participate in the survey via the embedded link and the option to participate in the focus group via the Zoom platform. Members were advised that identifying personal data would not be associated with the link to the survey, which permitted members to participate anonymously to protect their privacy. The quantitative data retrieved from the survey were analyzed by applying descriptive statistics using SPSS. The qualitative data, a Zoomed focus group, was used to gather details regarding the teachers' experiences and perceptions and emerging themes regarding their experiences teaching in online environments during COVID-19. To bring context and depth to the overall technology experience, the qualitative data used deductive coding after the recording was transcribed, coded, and

analyzed. Deductive coding uses a rough codebook and data sorted into categories by words and phrases uttered by participants (Creswell, 2014; Yi et al., 2018). Tables were created to showcase the results of the quantitative and the qualitative data for clarity.

Definition of Key Terms

21st Century Skills

Knowledge, skills, habits, and traits many believe to be important in academic and professional workplaces. These skills may be used across all academic, career, and civic settings throughout a student's life (Sabbott, 2013).

Andragogy

This is the art and science of how adults learn best, conceptualized by Malcolm Knowles (Merriam-Webster, n.d.-a).

COVID-19

An illness caused by a virus with symptoms ranging from mild to severe (Merriam-Webster, n.d.-b).

Descriptive Statistics

Used for depicting the main aspects of sample data without necessarily inferring to a larger population. Descriptive statistics typically encompasses the mean, median, and mode to indicate tendency, range, and standard deviation. These calculations reveal how widely spread the scores are within the sample. Charts, graphs, or histograms are used for descriptive statistics (American Psychological Association, n.d.-a).

Digital Competence

The ability to confidently use digital technology to get information, communicate, and perform basic problem-solving within various aspects of life (Foadi & Varghese,

2022).

Distance Learning

A way of teaching supported by digital technologies and the Internet to improve the quality of learning by providing access to resources, remote exchange, and collaboration (Merriam-Webster, n.d.-c).

Highly Qualified Teachers

To be deemed highly qualified, teachers must (a) have a bachelor's degree, (b) have full state certification or licensure, and (c) prove that they know each subject they teach (USLegal, 2022).

Hybrid Learning

Combines traditional classroom experiences, experiential learning objectives, and digital course delivery that emphasizes using the best option for each learning objective (Saichaie, 2020).

Inferential Statistics

A range of statistical techniques that allow inferences about characteristics of a population determined from a sample of data. These techniques include approaches for testing hypotheses, estimating the value of parameters, and selecting a set of competing models (American Psychological Association, n.d.-b).

Information and Communications Technology

All devices, networking components, applications, and systems that combined allow people and organizations (i.e., businesses, nonprofit agencies, governments, and criminal enterprises) to interact in the digital world (Pratt, 2015).

Learning curve

The course of progress made in learning something (Merriam-Webster, n.d.-d).

Pandemic

A situation occurring over an expansive geographic area and impacting a high proportion of the population (Merriam-Webster, n.d.-e).

Perception

Observation; a mental image or concept; quick, acute, and intuitive cognition (Merriam-Webster, n.d.-f).

Professional Development

Specialized training, formal education, or advanced professional learning intended to assist educators and administrators in improving their professional knowledge, competence, skill, and effectiveness (Sabbott, 2013).

Professional Learning Community

A group of educators who may meet on an ongoing basis to share knowledge and to work collaboratively to improve student success. The term is also used for school-based content areas that collaborate for professional development (Sabbott, 2013).

Personal/Professional Learning Network

A tool that uses social media and technology to collect, communicate, collaborate, and create with connected colleagues anywhere at any time; participating educators worldwide making requests and sharing resources. Each educator becomes a potential source of information (Davis, 2009).

Self-Efficacy

An individual's beliefs in their abilities to accomplish a task (Cambridge

Dictionary, n.d.-a).

Social Media

Online technology networks where the sharing of ideas, thoughts, and information

are used throughout virtual communities (Cambridge Dictionary, n.d.-b).

Stakeholder

Anyone who possesses an investment in a school and its students; may include

administrators, school staff members, students, parents, families, community members,

local business leaders, and political leaders. Stakeholders may also be local businesses,

organizations, advocacy groups, media outlets, and organizations representing specific

groups (Sabbott, 2013).

Technological Self-Efficacy

One's belief about one's ability to succeed at a specific task that involves using

technological tools (IGI Global, 2021).

Technology

A way of completing a task, especially technical processes, methods, or

knowledge (Merriam-Webster, n.d.-g).

Significance of the Study

This study is timely and significant due to the fluctuating health status of the

communities and the educational organizations due to the COVID-19 pandemic. As

school systems change from in-person to distance and hybrid learning, teachers continue

to be impacted by the continuous influx of changes and directives depending on their

location and the spread of the virus. Technology implementation under traditional

circumstances is challenging with support; however, educators had to pivot quickly to

convert their content to an online platform. Depending on the type of school and district of their employment, some educators may have access to resources while others may not. Although COVID-19 was a mitigating factor following the shelter-in-place orders and the closure of the school, it indeed just amplified the issues facing American schools.

Limitations

There are a few limitations included in this study. First, I am the researcher and a member of the RIST professional organization, which may lead to some bias. I facilitated the focus group and recorded the session via Zoom. There is just one chapter in the urban region with a membership of just over 400 highly qualified teacher members. I do not possess the authority over the membership to guarantee a specific number of surveys returned or how quickly they were returned. A large portion of the RIST group was targeted with the hope of getting a significant number of surveys returned to have reliable data.

Delimitations

The study involved a diverse group of highly qualified teachers from a region in the southeast area of the United States. All participants have a minimum of 3 years of teaching experience and are considered highly qualified; however, RIST has a limited number of male members. Their current work locations may be in a charter, private, or public school near an urban area.

Conclusion

The spring of 2020 brought the COVID-19 pandemic, which crippled the world socially and economically when the spread of the virus impacted millions with hospitalizations, death, and the shutdown of various businesses and educational

institutions. This virus required many countries to mandate citizens to remain in their homes to help reduce the spread of the virus. The order to remain at home meant that students had to receive learning content through an online environment. As schools began to shut down, city by city, teachers were required to face the 21st century head-on, sooner rather than later. Some teachers could seamlessly transition their brick-and-mortar content into the distance learning environment, while others struggled. Technology learning opportunities for teachers from all backgrounds and experiences have been varied and ineffective regarding technology since the implementation of technology in classrooms. Teachers' comfort levels in integrating technology into classrooms varied due to prior technology exposure and training. Most professional development opportunities did not provide what the adult learners may have needed to be effective. To address the potential issues with professional development, institutions may need to implement andragogy-based technology training.

Chapter 2 reviews the literature related to andragogy and its history, technology, and significance to remote learning, hybrid learning, COVID-19, teacher self-efficacy, and technology professional development opportunities. The results may influence teachers' technology interactions with methods to combat integration and learning obstacles.

Chapter 2: Literature Review

Overview

A review of the literature reveals the significance of the ISTE standards, self-efficacy, and professional development as common recurring themes when discussing teachers and technology integration (Kennedy, 2016). This literature review explores the relevant research regarding the elements impacting teachers' technology self-efficacy at the high point of infections and throughout the COVID-19 crisis while teaching in K–12 remote and hybrid environments. The model is only targeted for areas meant to impact students; it does not consider the educator as a learner. The model highlights learning through a social or psychological approach (Byrne, 2015). These styles send information in straightforward approaches to create change and rule out customization in learning or learner-centered guidance (Knowles et al., 2005).

Professional Development

Effective professional development training does not always appear in the same manner to all participants, and given the challenges in educational reform, it may need to include collaboration and technology due to the current need (Pina, 2019). A growing trend is emerging among educators as they engage and collaborate in online communities via social media to meet their needs when school districts struggle with the challenge of offering support as they see resources decline (Bayar, 2014). Research suggests that engaging in online communities of practice and social media personal/professional learning networks produces concrete benefits. On the other hand, the professionalization of adult instruction is getting much consideration worldwide. This assertion is valid because adult learning experts' capabilities affect adult learning adequacy (Beszédes,

2021). Simpson (2017) conducted an exploratory study with the primary reason being to fill holes in existing research on the comparative forms and qualities of learning from formal professional development and more self-directed instructor groups. Simpson's exploration concentrated and portrayed the degree to which both adjust to proposals for professional learning and the degree self-coordinated groups line up with suggestions for point-by-point sharing and show of training. Simpson's research additionally shed light on the arrangement of expert learning and self-coordinated educator group exercises to the difficulties and requirements portrayed by instructors concerning meeting the expanded difficulties of the common core state standards in mathematics while utilizing new educational program assets.

Simpson's (2017) exploration study utilized a subjective procedure to comprehend the encounters of a test of fourth-grade educators over 7 who were occupied with formal professional development and worked in synergistic self-coordinated groups. Two schools in the United States were utilized as examination locales to concentrate on the fourth-grade groups. Essential information sources utilized in this research were member meetings, studies, and recorded video perceptions. These sources were investigated to make a graphic story of both fourth-grade groups. The video perceptions permitted the information from the overviews and meetings to become animated to make a thick depiction of the two groups as reactions from the review and meetings worked out during the recorded group (Simpson, 2017).

Initial insights from Simpson's (2017) research discovered two educator groups with a trust culture that functioned well together. Learning in good professional development did not align with formal learning encounters and did not adjust to their

revealed needs. In comparison, one group regularly utilized communitarian language to explore the Common Core State Standards-Math (CCSS-M) and supporting educational program assets, and the other group utilized student survey information to establish their self-coordinated learning while essentially utilizing a closed discussion style. The two groups had individuals participate in formal professional development sessions that were self-coordinated and started. These turned into an essential wellspring of new learning for specific individuals from the group (Simpson, 2017). Findings from this study included improving the intersection of formal professional development and self-coordinated groups through self-coordinated conventional professional development experiences. These learning openings were started by either the whole group or part of the group and had a substantial effect. These encounters pervaded the conversation at group gatherings and drove the plan at different gatherings. However, the members who proceeded with continuous learning encounters from proper coordinated professional development included genuine changes inside the session. These two instructor groups included current discussions on how school pioneers might best help instructor learning, explicitly math learning at the building level, and what specific conditions and commitments communicate with the viability of formal expert instructor groups.

Education technology integration in K-12 training has been supported by the public, state, and territorial accreditation organizations through various plans, including the Public Schooling Innovation Plan and the Upgrading Instruction through Innovation (Ed-Tech) State Program, among others (Staker et al., 2011; Kennedy, 2016). According to Havard et al. (2018), research has uncovered constructive outcomes of technology on academic accomplishments.

An investigation of 46 examinations, including 85 autonomous discoveries and enveloping 36,793 students, uncovered a constructive outcome when using technology tools. This outcome was due to the educators' effective professional development training (Havard et al., 2018).

Andragogical Professional Development

Past studies have shown that educators expect information to include technology in their educational practices and planning content for students (Chaipidech et al., 2021). Current professional development for teachers may be better suited through the lens of the andragogical learning theory since it was designed for adults. Experts in adult learning are frequently andragogically unskilled people, and national public education policy also assumes a critical part in this (Beszédes, 2021). Andragogy, Franco (2019) stated, comes from the Greek words *andra*, which means *grownup*, and *agogos*, which means *chief of* (Pratt, 1988). In contrast to gaining knowledge of theories for children, Knowles theorized in 1988 that adults learn based on their (a) want to recognize, (b) self-concept, (c) experiences, (d) readiness to study, (e) orientation to mastering, and (f) motivation (Pratt, 1988). The variations between children's mastering and personalized learning are associated with adults having lived and experienced greater than children. Adults' existence reviews affect their intrinsic motivation to analyze in addition to how they research. Abela (2009) asserted that adults are also stimulated by outside elements, including a task or an income. In other words, motivation to examine is a primary component of the difference between person and infant learning theories. Taylor and Hamdy (2013) asserted that the adult learning traits differentiating adults from children are not unique to adults; however, they are much more likely elements of a continuum of

gaining knowledge that occurs during one's life span. Taylor and Hamdy recommended that each learner circulates along the continuum at their own pace, encouraged by the six categories in andragogy.

In 2021, Beszédes compared the historical background and traits of university-level andragogical programs in two countries. The comparison displayed a disparity due to one country's educational system being institutionalized, and the program disbanded, while the other country's program flourished, and an evolving system can be seen. The ISTE standards, which are globally recognized, give them skills to master and education in this computerized age, giving a thorough guide to the successful utilization of innovation in schools worldwide. Grounded in learning science research and given professional experience, the ISTE standards guarantee that utilizing technology for learning can make significant, manageable, versatile, and fair learning opportunities for all students (ISTE, 2021). As recent research has revealed, even if distance and hybrid learning become the future of education, technology standards will provide the balancing scale in those changing traditional classroom environments (Chang, Chung, et al., 2020). With the impact of COVID-19, one of these changes is the role of the teacher due to the advanced technology and access to these tools (Mundy et al., 2012).

Although instructors throughout the planet have different styles and norms for learning, there is one thing on which they appear to concur: A computer is not a classroom. Learning happens for adults when the brain's neuronal network connects with content over a period repeatedly in short chunks (Friederichs, 2018). Additionally, learners must be able to associate the content with something they know to activate a connection. McKinsey and Company's study concurred that online is not the best spot for

learning and surveyed educators in eight nations to rank the viability of distance learning between the spring and July of 2020 (Lund et al., 2021). They gave the viability a score of 5 out of 10. The grades from educators in Japan and the U.S. were almost 60% for distance learning, somewhere in the range of 1 and 3 out of 10 respectively. While the quality and emotionally supportive networks around distant learning have likely improved from that point, this is still a striking event (Verbeke & Yuan, 2020).

Types of Professional Development

Proficient improvement in action research techniques can build teachers' attitudes toward the reception of evidence-based practices and information-based navigation. In any case, a top-to-bottom review of studies revealed that action research professional development might not be open to all teachers as they are often available to full-semester undergraduate as well as graduate courses, entry-level positions, and educator preparation programs (Esparza et al., 2022).

Action Research Module

Esparza et al. (2022) used constructivist methods to deal with fostering three-meeting curricular sessions (180 minutes of complete guidance) that presented members with activity research ideas. During the first meeting, concise intuitive talks were held, joined by a coordinator, to acquaint the members with action research activity. Following introductions, members took part in a hands-on Plan an Action Research Study activity, where participants had the option to choose from three cases depicting typical classroom issues, examine and arrange to resolve this issue by selecting an appropriate methodology, and then decipher their mock information to compare their inquiries. The organization of these movements was to imitate the course and to support the proper

procedures for directing activity exploration; for example, concentrating on a plan, blended strategies, information assortment, information translation, emphasis, and spread. Learners were encouraged to work in groups of four or five to energize conversation of activity research techniques and advance collaborative critical thinking among everyone. In the last meeting, ideas, collaborative planning, and gathering conversation procedures all through the "gallery walk" segment of the module allowed members to examine similitudes usefully and contrasts between their origination of activity research.

According to Esparza et al. (2022), no past studies have characterized the apparent benefits or challenges that energized or kept educators from genuinely engaging in action research. Educators saw that it would be best for them to participate in the activity research work within the module and they would see enhancements in their professional development. Professional content knowledge is the ability to think about information in order to showcase the content in the future using various techniques which opens doors for collaboration and therefore improves student success (Esparza et al., 2022). Having professional content knowledge and comprehension of action research assists instructors with assessing the effects of the one-of-a-kind context-oriented factors inside their homeroom, how they might interpret the material, and educational techniques on learner results (Shulman, 1986). For a better understanding of the relevant content, learners need to incorporate writing in their action research activity programs, with facilitators noticing that activity research activity enables them to adopt a more comprehensive way to guide, to grasp the lived encounters of their learners (Goodnough, 2011; Kosnik & Beck, 2000; Kitchen & Stevens, 2004). Comprehending learner needs is an indispensable first step to identifying problem areas during the activity research

process. The module coordinated contextual investigations where acknowledgment of learners' battles or logical steps were basic to movement in the Plan an Action Research Study workshop. Planning to consider gathered information and uncover issues in even the obscure features of classroom elements — like learner issues and associations — may aid educators with planning to manage what is required for learners (Crawford-Garrett et al., 2015). Esparza et al. posited that people could share the difficulties (individual, etc.) that they experience as teachers and work toward further development in targeted areas identified by their activity research, accordingly, starting the course with consistent expert advancement informed by classroom information (Cochran-Smith & Lytle, 1999).

Action Research Potential Issues

Possible hindrances to future action research in Esparza et al.'s (2022) research predominantly calculated issues like the absence of time and resources. Participants proposed that they would coordinate efforts with college-based educators, managerial workforce, or different K-12 educators to address such difficulties. A group showed their interests in action research, explicitly on the study's use, test size, and a general feeling of dread toward learner cooperation in the action research. Learner-focused class practicing is expected, particularly when different classes reproduce the use of the instructions in an objectivist manner instead of constructivist professional development (Paulus et al., 2020). Activity examination can shape instructor perspectives toward cooperative practice and collaboration and, hence, is a suitable answer for large numbers of the strategic issues raised by participants (Burbank & Kauchak, 2003).

Learners can become tired and come up short on their initial feelings to buy in to identify an adequate amount of information to perform classroom practice that may

require change (Porter & Freeman, 2020). Esparza et al. (2022) stated that past research had shown increased intuitiveness related to action research activity. Information sorting can diminish learners' challenges and increase learner participation (i.e., reaction rates) in action research activity projects (Rogers et al., 2006). Classroom action research activity is exceptional in that information can be effortlessly gathered from the tasks teacher learners feature with their coursework without the need to conduct outside assessments used exclusively to assess student results. For those worried about observations, the standards tend to align with curricular objectives (e.g., evaluations of effect or professional objectives), and educators can offer additional opportunities for students to develop further (Luccasen & Thomas, 2010). Esparza et al. believed future facilitators should examine strategies to protect learners from teacher-focused experiences and increase learner collaboration in action research.

Cooperative Learning

Cooperative learning (CL) has produced a broad range of advantages for student learning. Some studies show that educators face difficulties rehearsing the strategy (Liebech-Lien, 2021). Liebech-Lien (2021) documented the story of one instructor's experience with CL according to a longitudinal perspective. It showed that the educator's cooperation in a professional development program with an instructor group upheld the use of CL. The group developed a training network. The study uncovered the ability of an instructor group to practice CL and highlight specific difficulties confronted while executing the technique.

A well-established educational model, CL has created a broad reach. Its constructive outcomes on students' academic and social learning are irrefutable (Johnson

et al., 2014; Kyndt et al., 2013; Roseth et al., 2008). CL gains vary from ordinary

gathering work, as organized by educators considering elements that interfere with

practical student collaboration. Liebech-Lien (2021) stated that when planning and

organizing a CL system, an instructor should consider five fundamental components:

positive reliance, individual responsibility, relational and low research abilities,

connection, and group handling. During CL exercises, students cooperate in small groups

to boost their and each other's learning (Johnson & Johnson, 1999; Slavin, 2014). CL

works on students' accomplishments, knowledge, inspiration, peer connections, and

success (Fernandez-Rio et al., 2017; Johnson et al., 2014; Kyndt et al., 2013; Roseth et

al., 2008). Collaborative learning empowers teachers to emphasize academic and

interactive skills in the students' growth opportunities, making this tool an incredible

asset for educator practice and student learning (Liebech-Lien, 2021). For instance, CL

empowers students to achieve a coordinated group effort and shows them relational and

researching skills. The ability to team up has been featured as a fundamental ability for

students in the 21st century (Binkley et al., 2012; Dede, 2010; Lamb et al., 2017). The

setting-driven professional development program was roused by the CL reasonable model

for learning together and involved the five components of CL as a directing structure

(Johnson & Johnson, 2002). It zeroed in on three sorts of CL: (1) casual CL, where

students cooperate in impromptu group meetings for various periods going from a

moment to a whole class; (2) formal CL, where students cooperate in groups for more

extended periods going from a solitary class if half a month; and (3) data gatherings,

which have had long-term heterogeneous enrollment. The professional development

program could be portrayed as a three-stage program including a studio, follow-up

meetings, and an initiative-taking activity research project in educator groups.

Liebech-Lien's (2021) study followed Daniel, one of the educators who participated in the professional development program, as he learned and executed CL for over 2 years. Three top-to-bottom, semi-organized interviews were directed with Daniel: one before he went to the initial session to find out about CL with his new educator group (2017) and two later meetings, which occurred following 1 (2018) and 2 years (2019). The meetings lasted somewhere in the range of 68 and 100 minutes and were recorded and transcribed word for word. The meetings and recordings were held in Norway. Foundational information, for example, field notes from the professional development program, gave relevant data to the review.

Daniel's sessions led to the importance of CL significance in the local area, and the study had a few ramifications for instructors' learning and commitment to CL (Liebech-Lien, 2021). To start with, Liebech-Lien (2021) supplemented the developing collection of writing on educators' use of CL by showing the impact of instructor cooperation and professional development, which works with numerous learning opportunities and dynamic learning, on instructors' completion of CL. Second, the study follows another path that shows the ability to research CL in educator groups that include training networks. Daniel's story enlightens the worth of an educator group cooperating to learn, investigate, and execute CL in suitable ways. Daniel's most memorable educator group was upheld by the professional development program, which brought about the instructors' learning and investigation of CL unfurling. This created shared encounters, a common collection, and a common obligation to conduct CL. Together, the colleagues became a local training area and CL experts. The ongoing review presents current

information about the capability of interdisciplinary educator groups for instructors' learning. Third, the review adds to the writing on executing CL by recording how one educator's use of CL after preparing was affected by joining an instructor group where CL was not customary practice. The difference in a group included an obstruction that kept Daniel from going ahead to use CL, which reveals the value of common local area training for support when using CL (Liebech-Lien, 2021).

Professional Development Activities

In 2022, Ilgan et al. studied the areas where educators needed professional development activities (PDAs). Eight hundred twenty-one educators working in various grades in public schools participated. The study revealed that PDAs made a positive impact on most instructors. It was seen that educators did not take part adequately in collegiality-based PDAs that had a friend instructing. These obstacles kept them from experiencing PDAs, any recurrence of experiencing collegiality-based PDAs, and the connection between their perspectives about the effectiveness of PDAs and their expertise. At last, it was documented that educators believed boundaries for their cooperation in PDAs, their degree of need for PDAs, and their recurrence of support in collegiality-based PDAs significantly affected their attitudes towards professional development (Ilgan et al., 2022).

The research aimed to examine where educators need PDAs, the obstacles that keep educators from partaking in PDAs, the recurrence of taking part in collegiality-based PDAs, their insight connected with the effectiveness of PDAs, and teachers' professional development levels (Ilgan et al., 2022). This study found that teachers' levels of need for PDAs and their frequency of participation in collegiality-based PDAs have

positive, significant effects on their attitudes towards PDAs. Also, teachers' feelings of

barriers to participation in PDAs were found to have adverse, significant effects on their

attitudes towards PDAs, which is an expected result. So, as teachers' beliefs about the

barriers to professional development increase, it is likely that their beliefs about the

effectiveness of PDAs will decrease. Also, as teachers' levels of need for PDAs increase,

their beliefs about their effectiveness will increase. On the other hand, teachers' attitudes

towards PDAs were found to have a positive, low-level effect on their professional

commitment. Collaborative PDAs increase teachers' self-efficacy, motivation to teach,

and job satisfaction, positively affecting their sense of belonging and intention to stay

(Blandford, 2012; OECD, 2019). The results of this research revealed the importance of

school-centered collegiality-based PDAs to be developed considering teacher needs.

From this point of view, rather than traditional PDAs, collaborative PDAs that consider

the sociocultural context of schools, as well as the individual and social contexts of

teachers, should be employed (Avalos, 2011; Morgan & Neil, 2004). Cooperation

between central authorities and local administrators leads to coordination which, in turn,

contributes positively to the design of PDAs according to the needs of schools and the

school staff (Collinson et al., 2009; Ilgan et al., 2022).

Distance/Hybrid Learning

Student interest and need for learning remotely and in hybrid learning

environments have made it a requirement for educators to effectively provide instruction

virtually (Leary et al., 2020). Jaschik and Lederman (2016) stated that 39% of advanced

education personnel have instructed an online course, 43% have instructed a mixed

course (consolidating face-to-face and web-based instructing) with 81% of those staff

having changed an in-person course over to a hybrid course, and 37% of staff have taken

a virtual course for credit as a student. The staff argued that it took more work to educate

online than in person (Rhode et al., 2017; Sailor, 2009). Subsequently, instructing online

was more troublesome since instructors would generally show how they were educated

(Borup & Evmenova, 2019; Davis & Rose, 2007) and did not have the experience of

being an online student (Jaschik & Lederman, 2016). While there was some crossover in

the ranges of abilities expected to educate in conventional settings and virtually (Davis &

Roblyer, 2005), unmistakably, different abilities are required to instruct successfully

online (Barbour, 2012; Davis, 2009). With interest in virtual instructor development,

there is a need to more readily comprehend the capabilities needed for effective virtual

educators (Ragan et al., 2012). There has been critical work done to foster digital

competencies for adult courses (Bigatel et al., 2012; Goodyear et al., 2001; Klein et al.,

2004; Muñoz et al., 2013) in K-12 settings (Dawley et al., 2010; Ferdig et al., 2009;

Pulham & Graham, 2018); most virtual competencies do not recognize the needs between

the novice and the accomplished virtual educator (Kebritchi et al., 2017).

Distance learning could be the key to the current problems in education or serve

as the catalyst for its eventual destruction (Mantha, 2020). School systems may choose to

create or expand their distance learning resources due to the occurrences of disasters in

nature such as bushfires in Australia, Hurricane Katrina in the United States, or the

volcano eruption and earthquake in the Philippines (Ayebi-Arthur et al., 2016; Padernal,

2020). Online learning provides new learning opportunities, innovative tools, and

solutions while at the same time presenting various obstacles for students, schools, and

communities (Mantha, 2020).

During distance learning, one goal for researchers was to understand better the difficulties educators faced during COVID-19 and the impact teachers faced on technology self-efficacy levels along with the many barriers, including teacher reluctance to transition to distance learning (Anderson et al., 2014.; Anderson et al., 2015). Although there is far-reaching availability in K-12 training, the limit of technology to increase academic achievement for students relies upon how teachers interact with their training (Tamim et al., 2011). The experience teachers received in preservice education may not have been sufficient to maintain an effective teacher-learning process (Bada & Prasadh, 2019). There is a correlation between the teachers' intent to integrate technology into their lessons and their self-efficacy and attitudes toward professional development (Chang, Chien, et al., 2020). Some aspects of online professional and adult learning programs need to be in place to teach adults effectively (Borovikova et al., 2019).

According to Dorn et al (2020), McKinsey and Company found after a prolonged pandemic interruption, pieces of the world are finally considering a restart. Where the infection was dying down, individuals could start amassing a way to deal with life and business that consolidated what they missed about the time before the coronavirus and what they found during the pandemic. That future should incorporate an arrangement for those, like the jobless, who are yet stuck on stop. Dorn et al. brought profound ideas into business and work environment issues with various research studies, articles, and podcasts. Dorn et al. studied 100 leaders, and 90% imagined a future with a mix of distant and on-location work, yet most (68%) had no definite arrangement for how it would function. The leaders studied from a wide scope of enterprises have a valid justification for wanting a future with distant alternatives: Huge numbers say it has

prompted expansions in efficiency and consumer loyalty (Dorn et al., 2020).

According to An et al. (2021), researchers examined successful web-based educational procedures. For instance, DiPietro (2010) investigated the insights of K-12 virtual teachers and detailed five thorough convictions accounting for their success. These included student relationships, practice, content engagement, actively dealing with the course content, and supporting student achievement. The convictions were portrayed regarding their objectives and practices. For web-based courses in K-12 schools, Morgan (2020) stated that schools should follow the ISTE standards while transitioning courses onto the web. These standards embrace equity, encourage communication, create student-focused learning experiences, and use effective resources. More research is required to address suitable virtual procedures and tools for K-12 learners during the COVID-19 pandemic (An et al., 2021).

Researchers found that video-based resources used for online instruction were effective. For example, Zoom sessions were especially valuable when tutoring was moved to a web-based platform (An et al., 2021). They filled in as a device for communication (Lowenthal et al., 2020) and for refining online classes while tending to the psychological health of students (Kaplan-Rakowski, 2021). Other than video-conferencing devices, different devices utilized during and after the pivot to web-based learning included tools for screen casting (Ranelucci & Bergey, 2020), home-to-school communication (Kinard & Mahaffey, 2020), customized learning (Jewitt, 2020), feedback using sound (Fitzpatrick et al., 2020), and more engaging exercises like a digital escape room (An et al., 2021; Neumann et al., 2020).

History of Andragogy

Learners benefit when their minds are open to learning the content. To the best of our knowledge, the term andragogy, described as the lifelong need to learn, was first authored by Alexander Kapp in 1833 (Henschke & Henschke, 2016). Historically, animals and children were studied by experimental psychologists to determine how they learn because variables were controlled, so not as much was known about adults (Knowles et al., 2005).

After World War I, the debate and interest in adult learners grew. Two streams of inquiry emerged: the scientific and the artistic or intuitive/reflective stream. Scientific streams seek to discover new knowledge through investigation, which was brought forth by Edward L. Thorndike's 1928 *Adult Learning* (Knowles et al., 2005). Thorndike primarily focused on learning ability with scientific evidence. Along with possessing the ability to learn, those abilities and interests were much more different than children. In the artistic stream, adults could learn while the artist seeks new knowledge through intuition and analyzing how adults learn using situations versus subjects (Knowles et al., 2005).

In 1926, Eduard C. Lindeman launched the artistic stream of inquiry with *The Meaning of Adult Education* (Knowles, 1978). Lindeman, influenced by John Dewey's educational philosophy, asserted that adult learners were not likely to be enticed by the restrictions of conventional learning institutions due to their experience. The adult learner's experience was the primary factor for acquiring knowledge, such as digging in reservoirs before consulting texts and other facts to discover the meaning of the adult's experience (Knowles et al., 2005). In support of the adult experience, the five senses are

the tools used to gain experience. Sight is deemed important, as it provides knowledge to the external world when visual objects are consumed with words used to explain the understanding of what has been seen (Jarvis & Watts, 2011). Prior to Knowles's andragogy assertion, intelligence level was the focus of most research. Criticism is associated with andragogy (Knowles, 1970). According to Merriam and Bierema (2013), we have a mosaic of theories, and no one theory or model can explain all we know about adult learners, the context, and the learning process.

Another broad timeframe passed until the term andragogy was utilized again in writing, this time in England. Simpson (2017) suggested that andragogy could fill in as a title for an endeavor to distinguish an assortment of information pertinent to the preparation of those worried about training. He proposed that the fundamental parts of andragogy correspond to what previously existed and child learning. The fundamental parts would be the investigation of the standards of adult learning, the instructive brain science of adults, and overall andragogical strategies for educating adults. Simpson exhorted that adult instruction endeavors to embrace these fields of study. Knowles procured the term in 1966 from Dusan Savicevic. After getting to know the term, Knowles meshed it with his very own lot of significance earned from his generally broad involvement with adult instruction. He consolidated his growing training with the college instructing of new adult instructors and comprehensively fleshed out his thoughts on andragogy through the distribution of *The Modern Practice of Adult Education: Andragogy vs. Pedagogy* (Knowles, 1970). The primary makeup of his andragogical articulation appeared as a process design rather than a content design, with explicit assumptions and steps. The expectation about adult students ends up being that they are

self-directed, their experience is a learning asset, their adapting needs are centered around their social jobs, their point of view is one of prompt application, their inspiration is significantly more inward than external, and they need to know an explanation that sounds good to them why they ought to get familiar with something specific they are being approached to learn. The learning measures adults need to be effectively and intelligently associated with are the groundwork for the learning experience they will experience, building up an environment helpful for learning, agreeableness, identifying their needs, setting goals, planning the arrangement, directing the exercises, and assessing student progress. These novel thoughts and hypotheses assisted with building up andragogy inside the United States. Eventually, andragogy would move towards adult and human resource training (Henschke & Henschke, 2016).

Adult Learners

There is shared authority and democratic learning in the classroom under this learning theory. Instructors learn just as much from the learner as they do from them. Linderman identified key assumptions about the adult learner, which have served as the foundation of adult learning theory and later research, summarized here (Knowles et al., 2005):

- Adults' needs and interests motivate learning.

- Adults' learning is relevant to their life.

- Adults' learning source is experience.

- Adults require self-direction.

- Adults' age will influence the differences among learners.

Edward L. Thorndike was the first to investigate learning in animals and reported that

these empty vessels would just respond to stimuli when rewarded (Knowles et al., 2005). He determined a link between sense impressions and an impulse to action, like when a kitten runs into the house after hearing a familiar call, "kitty kitty," to experience milk it can drink (Thorndike, 1991). This system was referred to as bond psychology, or connectionism, and the original psychology of learning, where a situation causes a response that results in satisfaction which illustrates the bond (Nevin, 1999).

Thorndike was more concerned with learning ability (Knowles et al., 2005). To support this concern, Thorndike proposed three laws: Law of Readiness, Law of Exercise, and Law of Effect, which could cover various fields (Ni & Lu, 2020). According to Ni and Lu (2020), combining the Law of Readiness and the timing principle would bring satisfaction when students are prepared and permitted to participate in class activities. Additionally, the Law of Exercise and principle of timing enhances the stimulus response connection when the learned response is repeated. With the Law of Effect and principle of timing, a situation occurring frequently creates a change that results in a satisfactory result.

A limited amount of research has been done on adults, even with the great ancient teachers like Confucius, Jesus, Socrates, and Plato, who were teachers of adults (Knowles et al., 2005). Due to their different experiences with adults, their ideology of the learning process leaned toward mental inquiry, which differs from the passive reception of formal education that dominates today (Henschke & Henschke, 2016; Knowles et al., 2005). They developed tools to engage learners, such as the case method by the Chinese and Hebrews, while the Greeks created Socratic dialogue and the Romans curated debate (Knowles et al., 2005). The 17th century European schools only prepared boys for the

priesthood and became known as the cathedral schools (Henschke & Henschke, 2016; Knowles et al., 2005). The students followed a set of beliefs, faith, and rituals of the church, and the assumptions about the learning and strategies for teaching were named pedagogy, meaning the "art and science of teaching children," which remains in the 21st century educational system (Knowles et al., 2005).

Researchers grappled with various adult learning theory frameworks; nothing was integrative and differentiating until Yugoslavian Dusan Savicevic reintroduced andragogy in 1967 in Europe and to the Americas (Henschke & Henschke, 2016). While Knowles has argued for "andragogy, not pedagogy," since 1968, the term andragogy was first coined in 1833 by a German teacher, Alexander Knapp, to describe Plato until another German denounced its use. A hundred years later, in 1921, German social scientist Eugen Rosenstock used the term in a report about his assertion that adult education mandated teachers, methods, and philosophy specific to their learners. Lindeman had visited Germany and brought the term to America, but the concept did not stick (Henschke & Henschke, 2016). Knowles thought he had created the word until 1962, when he was told of its earlier use. Although used sporadically, it did not gain steam until the late 20th century (Knowles et al., 2005).

The characteristics of the andragogy learning theory are preparing procedures in advance to involve the learners in a process involving these elements: preparing the learner; establishing a climate conducive to learning; creating a mechanism for mutual planning; determining the learning needs; creating program objectives to satisfy these needs; designing learning experiences; and conducting learning experiences with suitable techniques and materials, while evaluating the learning outcomes and diagnosing learning

needs (Knowles et al., 2005). It was not until 1995 that Knowles realized eight steps were needed, not seven. The need to prepare the learner for the process became apparent because learners had been conditioned to depend on teachers to teach them (Knowles et al., 2005).

An analysis of the traits Knowles (1978) identified with andragogy is that student reflection is excluded as impacting the learner. Reflection learning (Schon, 1983, 1987) supports those students who reflect and adjust their previous understandings to incorporate new learning and are ready to foster a better understanding of the content. For instance, clinical learners practice a process on a non-living item, think about what worked and did not work to create a methodology for improvement, and execute a subsequent endeavor. From an alternate point of view, Mezirow (1997) recommended that grown students' propensities in making significance are important aspects identified with learning. All in all, students' past encounters impact how they learn as adult learners, as Knowles (1978) reported. An open, intelligent student search to comprehend what is perused or spoken to precisely decipher the importance as opposed to indiscriminately executing past learning conventions to translate content. Reflection is needed to think about alternative learning methods (Franco, 2019).

Training for Distance/Hybrid Learning

The U.S. Department of Education Office of Educational Technology (2020) stated that teachers should be "fluent users of technology; creative and collaborative problem solvers; and adaptive, socially aware experts throughout their careers" (p. 1) to guarantee congruity of learning for any circumstance and to help students.

Trust and Whalen (2020) conducted a study with 325 K-12 Massachusetts

teachers and teachers using social media to capture their experiences implementing online teaching in an emergency. They analyzed the dataset with descriptive statistics for the quantitative items and engaged in a thematic analysis (Braun & Clarke, 2006) for the open-ended question. Most participants worked in American suburban and urban schools, while less than 10% were in foreign countries. More than 80% of the participants worked in public schools, while the remaining 20% taught in private or charter schools. Overall, the teachers did not feel prepared to use online teaching and therefore struggled with pivoting their content. Due to the need for additional support, the teachers leaned on informal and self-directed learning with their professional networks (Trust & Whalen, 2020). The findings resulted in recommendations that included creating "unstructured professional development (e.g., mentoring, or online forum)" (Zweig & Stafford, 2016, p. 411) and socially connected, learner-centered activities that allow educators to expand their knowledge and skills to help increase their skillset with technology in any format or situation, including online, remote, or blended settings (Trust & Whalen, 2020).

Early virtual literature courses centered around professional training for new staff in virtual learning instead of assisting the decently experienced virtual instructor with improving in degrees of ability (Rhode et al., 2017). Examinations in the learning sciences (Bransford et al., 2000), just as in instructive technology (Mishra & Kohler, 2006), highlights the possibility that many of the best instructive practices are domain specific. A significant part of the current web-based learning work centers around broad instructional methods instead of content-specific learning practices (Mishra & Kohler, 2006). With interesting capabilities needed by online teachers, ably arranged proficient improvement is required as numerous educators instruct in the virtual course, while

numerous others are veteran online instructors (Taylor & McQuiggan, 2008). Virtual

educators face numerous difficulties as they figure out how to demonstrate different tech

abilities than what are required in an in-person climate (Alexiou-Ray & Bentley, 2016;

Davis, 2009). It is not clear how much staff use professional development accessible to

them and what parts of the preparation are helpful to their improvement as online

teachers. Proof in the K-12 training space tracked down that 20% to 38% of online

instructors received professional development before instructing virtually, with 28% to

38% accepting their training during their first year of education (Rice & Dawley, 2009).

Research revealed just 4% of K-12 educator programs in the U.S. offer field experience

in virtual education (Archambault et al., 2016).

Self-Efficacy

A construct represents a person's confidence in their ability to do something

(Bandura, 2011). It is a helpful indicator to predict the effectiveness of technology

integration initiatives (Albion, 1999, as cited in Slutsky, 2016). Bandura (2011) conveyed

that self-efficacy was embedded in social cognitive theory and that it needed to be

understood to grasp the nature and function of self-efficacy fully. Bandura's (1994) four

sources of influence are mastery experiences, vicarious experiences, verbal persuasion,

and physiological arousal.

Bandura (1977) found self-efficacy to be significant regarding perseverance when

people with a high amount of self-efficacy encountered challenges. However, when

people had a low amount of self-efficacy and had the same challenges, they would have

feelings of hopelessness. Anderson et al. (2016) tried to understand better the difficulties

that professors faced in the transition to online learning through a survey that gauged

their teaching self-efficacy. Anderson and Putman (2019) examined different variables along with the many barriers, including teacher reluctance to transition to online learning, which would inhibit the effectiveness and success of online learning. Demographics, attitudes, and fear were surveyed as factors impacting self-efficacy. The results revealed that those with a higher teaching self-efficacy were more likely to work through those challenging situations, such as students within their classrooms being unable to operate technology tools beyond social media applications (Edwards, 2017). While those with a lower self-efficacy would benefit from professional development opportunities to strengthen their practice and confidence in online instruction, they did not believe their weaker confidence level would benefit them when basic skills should be the focus of their learning (Li, 2007).

Stringer et al. (2022) reviewed teachers' experiences implementing technology to ascertain the amount of support necessary for a positive outcome. Using the analysis of 23 studies from several countries, they found no parallel between age and strategies when implementing technology. Inside the educational system, educators' technology self-efficacy, confidence, and self-esteem impact long haul change because of their impact on instructors' motivation (Mannila et al., 2018). Conduct (Bower et al., 2017; Mannila et al., 2018), obligation level to implement technology (Bower et al., 2017; Riches & Smith, 2022), and resilience are experienced by teachers when encountering challenges (Mannila et al., 2018; Rich et al., 2021). Indispensable to this specialized learning region, Vivian and Falkner (2019) tracked down educators with higher technology confidence who used specialized tools and referred to learning targets more than those with lower levels of confidence.

Vivian and Falkner (2019) noticed that females, secondary educators, and educators with no technology instructing experience had lower technology confidence than their partners, with the differences credited to the newness of technology in elementary schools and instructors' absence of involvement in this learning region. Mannila et al. (2018) found that educators held comparative degrees of self-efficacy across all computerized skill regions, e.g., instructors with low technology self-efficacy had low capabilities across all technology regions and the other way around. This influenced them to guarantee that instructors with different self-efficacy (low, medium, high) have different needs that one-size-fits-all professional learning and development sessions do not meet. Then again, Rich et al. (2021) saw that educators' confidence did connect with the specific digital technology idea examined, with Rich et al. finding that educators were less confident in their personal reflection of their abilities, conditions, factors, and determination.

Teaching With Technology in Distance/Hybrid Learning Environments

Instructors need to see the significance of innovation and technology integration. Learners with remarkable results require better instruction and the incorporation of technology into educational programs, which will improve learners' academic learning measures (Slutsky, 2016). Educators who use technology tools as critical thinking devices change the way they instruct from a social way to dealing with a more constructivist approach (Slutsky, 2016). In 2017, the U.S. Secretary of Education stated that "one of the most important aspects of technology in education is its ability to level the field of opportunity for students" (U.S. Department of Education, 2017). With the increased use of social media, it makes sense how it influences our current educational

system and how we approach teaching future generations. When the Every Student Succeeds Act (ESSA, 2015) was implemented in 2015, professional technology development was seen as a need for teachers. Teachers were expected to prepare students with digital literacy and increase their overall academic achievement at the K-12 level (ESSA, 2015).

According to the U.S. Department of Education's (2017) National Education Technology Plan, teacher technology competencies deserved attention, even though it did not suggest an immediate adoption. Stakeholders were encouraged to be a part of the conversation on technology competencies as most teacher preparation programs only provided a semester-long course (Foulger et al., 2017). Experiencing such short exposure goes against integration, which means technology would be aligned with content such as science, math, history, or literacy (Foulger et al., 2017). Even with the U.S. Department of Education (2017) calling on teacher preparation programs to rethink their approach, Foulger et al. (2017) asserted that teachers have fallen short with planning, modeling, and implementing the proper balance of technology within their content area and need additional support.

An et al.'s (2021) mixed methods study concentrated on K-12 educators' sentiments, encounters, and viewpoints with respect to digital instructing during the COVID-19 pandemic. The study also inspected the instructors' points of view about the "new normal" after COVID-19 and how they could prepare for future crises. Quantitative and qualitative data were gathered from a web-based survey and follow-up interviews. A sum of 107 educators from 25 states in the United States finished the web-based review, and 13 educators from 10 distinct states participated. The outcomes uncovered educators'

sentiments about online instructing and the different techniques and tools they operated

with during the beginning phase of the COVID-19 pandemic. The difficulties

experienced by educators during the pandemic included student attendance, student

cooperation, and commitment (or absence of parental help); students' lack of technology

access; concern about students' economic situations; no in-person connections; and no

balance between fun and work activities while learning technology. Four significant

subjects arose regarding how teachers are more likely to face future crises: (a) technology

professional development, (b) access to technology devices, (c) technology course for

instructors and students, and (d) action plans and communication. As to the points of

view about the "new normal," five significant subjects arose: (a) more web-based or

hybrid learning, (b) reevaluating the now, (c) cleanliness and social distancing, (d)

alternate schedule with smaller classes, and (e) vulnerability and worries about tomorrow.

　　　　Hybrid learning spaces can be characterized as learning spaces that obscure the

limit among physical and virtual conditions where online students, classroom students,

and teachers can collaborate with one another, and the course substance can be conveyed

simultaneously and asynchronously by utilizing technology devices, imitating

interactions during the same period (Akkoyunlu & Soylu, 2006; Staker et al., 2011).

Plans engaging with hybrid learning spaces prompt stakeholders to think about how

individuals tackle such undertakings and how they create and share plan strategies. The

fields of instructive innovation and informative plans have made a constant flow of

models that say how configuration ought to be done. However, there is little examination

of what educators do (Goodyear, 2020). Contrasted with face-to-face or internet learning

conditions, the execution of blended learning spaces is expensive given that the spaces

make all learning alternatives accessible for students. Subsequently, choices on interests in blended learning are essential for establishments (Xiao et al., 2020). Students' success and experience are significant markers for surveying the expense adequacy of learning space execution; in this manner, forecasts of students' success and experience can educate foundations dynamic on learning space speculations. In addition, learning skills are associated with student's success and involvement with general and virtual settings (Xiao et al., 2020).

Need for Technology Self-Efficacy

Teacher technology self-efficacy is critical to ensuring they can provide learners with effective 21st century skills like using technology tools to demonstrate their learning by analyzing, creating, and reflecting on content effectively (Barton & Dexter, 2020). A certain level of confidence and risk-taking characteristics of the teacher should be present and modeled because this is how adolescents learn best. For this to be present in the teacher, the adult learning process must be known, understood, and implemented with fidelity throughout the teacher's career (Barton & Dexter, 2020). Knowing what impacts technology self-efficacy will provide specific areas for teacher education programs, school districts, and teacher organizations to develop curriculum or professional development opportunities for teachers. Barton & Dexter, (2020) interviewed middle school teachers about their participation in a leadership development program to show that leaders are responsible for teachers' learning opportunities. Through reflections, the teachers shared their concerns about professional technology development.

Self-efficacy by the teacher is essential if effective technology integration is to happen. Wang et al. (2018) created the PC Innovation Coordination Overview. The

Likert-style survey was designed to uncover how instructors felt about the integration of technology in learning spaces and utilized as pre-and post-overview measures. Through factor investigation and Cronbach alpha coefficients, the instrument was discovered to be both a substantial and a dependable instrument (Wang et al., 2018). Hixon et al. (2012) suggested that leadership in instructive technology should be founded on changes from the past, which implies the associated requirements placed on instructors with technology are flexible and simple to utilize. Sense-making, an illustration of social cognition change theory, depends on the associations people make between how they might interpret the world and the happenings around them (Weick, 2012). The emerging view of the K-12 instructors linked their technology self-efficacy with new abilities. Despite knowing what situations or technology tools have improved teachers' technology self-efficacy in the past, there are no common descriptors to guide technology self-efficacy change. The language of technology self-efficacy in previous studies has been binary.

The language utilized by the members of the review was overwhelmed by three fundamental classes: locus of control, inspiration, and self-idea. These classes share a shared characteristic with constructivist topics in that they have groupings that become more mind-boggling with each developmental stage (Cook-Greuter, 1999; Kegan, 1982). As per past examination studies, an individual can think about the previous method for sense-production. However, those previous methods are not compelling whenever they have been overwritten (Kegan, 1982; McCallum, 2008; Townsend, 2013). Approaches to understanding are combined and progressively more mind-boggling (Kegan, 1982), and as an individual becomes mindful that a component of a framework is presently not sufficient to satisfy the needs of new data, a more perplexing framework will be created

to redress (Cook-Greuter, 1999; Kegan, 1982). The members of the study who showed the best innovation of self-adequacy securing, considering their language all through the concentration, likewise demonstrated a more assimilated locus of control and personal inspiration and a more joyful self-idea. These were likewise the members who were the most associated with the exercises and found more applications for what they had learned beyond the classroom.

A similar methodology could be helpful as an expert improvement opportunity in other instructive settings. Investigation of the members' impressions, the procedures they utilized to master and apply the abilities introduced, and the kinds of help they require could show new bearings for an innovation self-viability study for K-12 educators and the local area they serve.

Crisis/COVID-19

Americans were introduced to COVID-19 in the latter part of 2019 as it began spreading worldwide. According to the Pan American Health Organization (2019), Coronaviruses are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. A novel coronavirus is a new strain that has not been previously identified in humans. The new Coronavirus, 2019-nCOV or COVID-19, is a respiratory virus that spreads primarily from person to person through small droplets from the nose or mouth, which are expelled when a person with COVID-19 coughs, sneezes, or speaks. These heavy droplets do not travel far and quickly sink to the ground. People can catch COVID-19 if they breathe in these droplets from someone infected with the virus. Initially, American citizens were encouraged to wear face coverings or

medical-grade masks. The United States of America accounts for 48.6% of all cases and 46.5% of all deaths for the Region of the Americas, and Brazil accounts for 27.4% of all cases and 25.1% of all deaths. Combined, these two countries account for 76.0% of all cases and 71.6% of all reported deaths in the Region (Pan American Health Organization, 2019).

Descriptive Statistics

Statistics is characterized by What is Statistics? (2022) as the science and craft of gathering, summarizing, and breaking down the information presented in the data collection. The two general classifications of summing up and analyzing information are referred to as descriptive and inferential statistics. The science and craft of summarizing information are considered where illustrative insights and designs are utilized to show information. The basics of elucidating measurements, including subjective and quantitative factors, are considered when depicting quantitative data; proportions of the area and spread, for instance, the standard deviation, are introduced alongside graphical introductions. Additionally, examining the dissemination of insights, for instance, the fluctuation and the utilization of changes, is valuable for revealing patterns inside the information and introducing the consequences of a task (Nick, 2007).

Statistics presented in a descriptive format provide helpful information to an expansive crowd, including individuals from the overall population. They address issues and questions in a straightforward and effective manner. They do not research more complex theories, represent connections among factors, or back causal assessments (Bloom-Weltman, 2019).

In 2019, the U.S. Department of Education conducted a grant-funded Statewide

Longitudinal Data Systems survey that included 47 states, the District of Columbia,

Puerto Rico, American Samoa, and the U.S. Virgin Islands to inventory systems and

assess their data capacity by applying descriptive statistical analysis (Bloom-Weltman,

2019). The Statewide Longitudinal Data Systems survey was distributed electronically as

an email attachment following a presurvey informational webinar which contained the

purpose and helped address any questions. Of the 56 states, only 46 completed the

Statewide Longitudinal Data Systems Survey, and no weighting was used to account for

any missing data. The returned responses were collated, and the data were cleaned to

ensure accuracy and then analyzed to produce an aggregated summary using simple

percentages for the findings. The results helped the National Center for Education

Statistics to assess the program and improve the technical assistance the program offered

states in the system development areas (Bloom-Weltman, 2019).

Preparing for a Crisis

Preceding the COVID-19 situation, scientists examined the ways of improving

instructors' readiness for school crises like acts of mass violence and bomb dangers. For

instance, Perkins et al. (2021) inspected educator readiness for a school emergency and

their impression of the viability of school crisis drills. Tipler et al. (2018) investigated

how various partners (school pioneers, staff, and guardians) answered school crises.

Zeroing in on the emergency readiness of online teachers, McBrayer et al. (2020)

analyzed the impression of emergency recurrence and readiness of online teachers in a

public K-12 web-based sanctioned school in the southeastern district of the United States.

The study detailed the members who felt extremely ready in different emergencies,

including suicides (53.1%), abuse (47.6%), disregard (45.8%), cataclysmic events

(18.9%), maniacal ideations (18.9%), unforeseen passing of a student (9.8%), the

untimely death of an educator (7.7%), and terrorism (7.7%). Suicides (53.1%) gave an

impression of being the central area, for which over half of the members felt extremely

ready. These results recommend a requirement for emergency crisis management and

preparation for online teachers. McBrayer et al. (2020) contended that teachers should be

cutting-edge on evidence-based procedures for the safety of the school and security

through intentional, cooperative, and practical professional development (An et al.,

2021).

Conclusion

Technology is a tool used in our daily lives. Teachers are using technology

increasingly within their classrooms, given the professional development and emphasis

placed on this area by various school districts in America (Barton & Dexter, 2020;

NCDPI, 2013). Given the crisis of COVID-19, the world, school districts, and everyone

had to look at learning differently when the spread of the virus went global. As distance

learning became the new normal, teachers had to adjust without notice or additional

training to provide hybrid classrooms or full online classrooms (Gillespie et al., 2021;

Pattison et al., 2021). Following the outbreak and shutdown, when students began to

return to school buildings to prevent the spread of the virus, some districts offered three

types of distant learning: synchronous, asynchronous, and hybrid learning, depending on

their plan and infrastructure (Gillespie et al., 2021; Mladenova et al., 2020). Some

teachers found their way with technology integration, while others did not do as well.

Through surveys with stakeholders, Mladenova et al. (2020) yielded results that revealed

that teachers needed time to pivot into this new way of teaching and test administration.

Prior researchers have shown the need for teacher self-efficacy and how professional development could help in higher education and K-12 spaces (Barton & Dexter, 2020). Bandura (1997) thought there were four significant self-efficacy sources: verbal persuasion, vicarious experiences, physiological arousal, and proficiency experiences. Verbal persuasion given by staff in leadership roles provides positive endorsement to teachers' abilities. Vicarious experiences happen when teachers observe a colleague's live instruction or modeling tasks. A physiological arousal occurs when teachers' emotional state reacts to a task, while proficiency experiences happen when teachers engage in tasks through live instruction or practice with competency. This study explored the elements impacting teachers' technology self-efficacy at the height and throughout the COVID-19 crisis while teaching in K-12 remote and hybrid environments. Securing the perspectives of RIST K-12 teachers from private, charter, and public schools into similar and contrasting experiences may guide the RIST organization with essential data to better serve their teacher membership. Viewing the framework through the andragogy lens, RIST may be able to consider this and the additional data when vetting professional development opportunities.

Chapter 3: Methodology

Introduction

The education world met various changes during the COVID crisis; schools closed to help reduce the spread of the virus, and students and staff had to pivot when learning content was transferred to online platforms, in addition to learning how to deal with maintaining healthy environments upon schools reopening (World Bank, 2021). This chapter discusses the research methods and procedures I used to examine the elements impacting K-12 teachers' technology self-efficacy while implementing distance and hybrid learning during the initial COVID-19 crisis. Viewing this examination through the lens of Knowles et al.'s (2005) andragogy learning theory, the gaps in learning opportunities can be highlighted to give teachers the assistance needed to hone skills that could enrich student learning in the distance or hybrid learning environment.

I used a mixed methods approach, first implementing a quantitative survey, the Technology Proficiency Self-Assessment (TPSA; Ropp, 1997). The survey was acquired from the Institute for the Integration of Technology in Teaching and Learning at the University of North Texas. It is reproducible for research and scholarly purposes (see Appendix A). The focus group questions (see Appendix B) were replicated and revised with the author's permission (Slutsky, 2016). The results emerged from the data analysis to provide a sound interpretation of the topic matter.

The TPSA survey has retained validity for more than 15 years to assess teacher self-efficacy regarding technology integration. Research with 1999 and 2000 educator information in Texas showed validity (Cronbach's alpha) going from $\alpha = .73$ (email) to $\alpha = .87$ (integrated applications; Christensen & Knezek, 2017). The estimates validity fell

within an acceptable margin, concurring with DeVellis's (1991) guidelines. In the 2004 results for Texas, which was acquired by Morales (2005), subscale validity went from .73 to .88, like those recorded in past studies. Cronbach's alpha for the entire 20-item scale was .93 (N=877). Gençtürk et al. (2010) revealed the entire (20 items) reliability scale of $\alpha = .94$ for elementary teachers (n = 205) in Turkey, exceptionally near the interior consistency dependability ($\alpha = .93$) revealed by Morales (2005) for educators in the U.S. and Mexico.

The TPSA was initially created and used in conjunction with other survey instruments to determine the use of computers and perceptions by preservice teachers (Ropp, 1997). I revised the TPSA instrument to include the COVID-19 pandemic, background information, and contemporary technology vocabulary. The survey instrument contains 18 statements/questions about the participant's technology proficiency and confidence level with technology. An additional eight demographic questions were included for a total of 26 questions for the quantitative data. Participants were asked to give a response to each statement on a 6-point Likert scale ranging from strongly agree to strongly disagree. All the statements began with the phrase, "During COVID-19, I feel confident…." The survey was received by the participants via Qualtrics, an electronic program.

The qualitative data emerged from a focus group discussion. The focus group participants responded to open-ended questions to elicit their views and opinions about their experiences. Participants were asked to explain their answers or provide additional details when needed. This information helped provide an in-depth view into the perceptions and experiences of the RIST teacher members. The focus group convened via

Zoom for no longer than 1 hour, which permitted me to take notes during the recording of the discussion.

Additionally, the following protocols were followed. Participants were asked to rename themselves in the Zoom waiting room to help protect their privacy before entering the main Zoom session. If the participant chose to do so, video cameras were disabled to help with Wi-Fi connectivity and any privacy concern. Participants were reminded of the option to discontinue their participation in the study at any time.

Research Design

A mixed methods approach helped me to gather both quantitative and qualitative data to determine results related to teachers' technology self-efficacy and distance learning during COVID-19. Creswell et al. (2003) provided an example of a visual presentation of procedures as identified by Steckler et al. (1992). For this mixed methods study, I used a triangulation design, as seen in Figure 2, where a culmination of the quantitative and qualitative data from RIST teachers' perceptions was triangulated with their technology professional development experiences. The participants for the focus group provided in-depth information, and these qualitative data were analyzed and coded for emerging themes from the event via Zoom. A Zoom video conference application was used due to the ongoing restrictions with COVID-19 in the community. The themes were interpreted to explain the elements that impacted RIST teachers' technology self-efficacy with distance and hybrid learning during the COVID-19 pandemic. The RIST organization houses elementary, middle, and high school teachers from public, private, and charter schools throughout the area.

Figure 2

Framework of Study

Triangulation Design

Quantitative
Data Collection
Data Analysis Results

Mixing
Results are merged
to validate results

Interpretation
Equal emphasis on
both data forms

Qualitative
Data Collection
Data Analysis Results
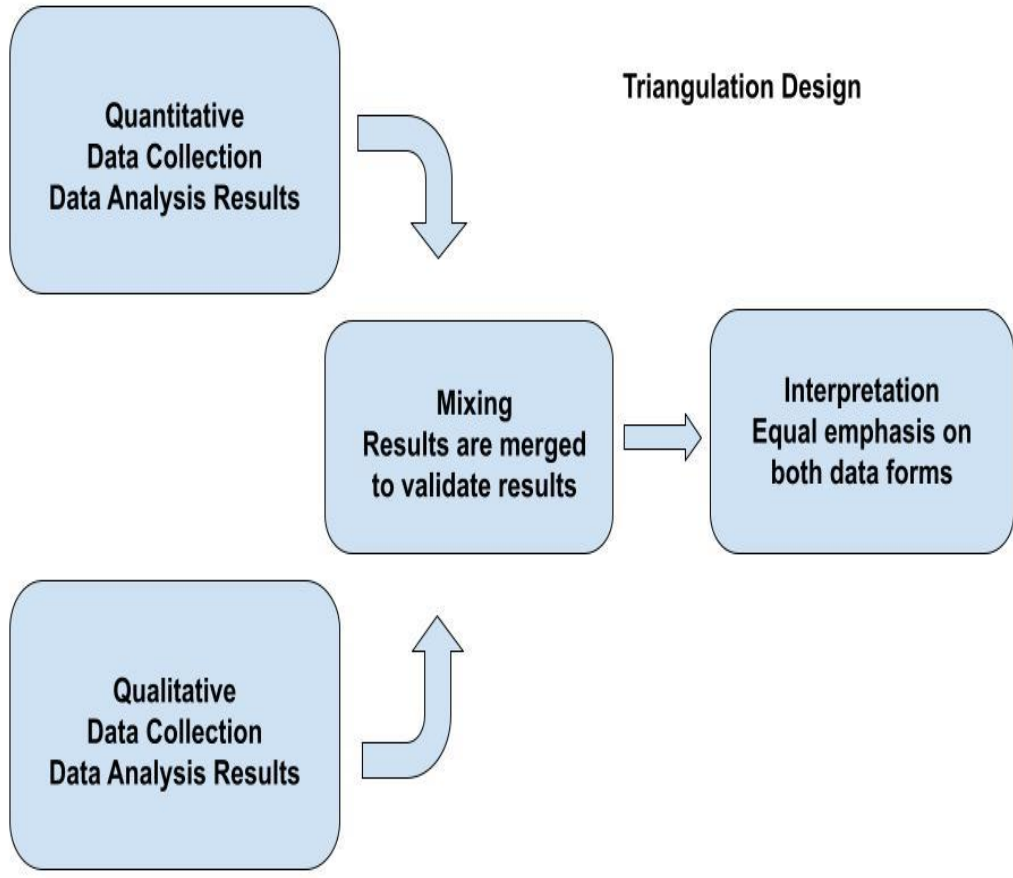
Note. Triangulation design.

While their access to resources may differ, as highly qualified, experienced teachers, the COVID-19 crisis placed most teachers in the same situation. The RIST educators represent a rich sample in this southeastern region in one space where learning needs could provide essential data for all teachers and stakeholders.

Research Setting

Participants in this study were members of a regional nonprofit teachers' professional leadership organization in a large urban southern city that I called RIST for

the purposes of privacy in this study. RIST was established to provide leadership opportunities and enhance professional expertise through training workshops to promote the retention of these effective educators. The organization was selected due to its membership's diverse nature and contribution to the educational community. Approximately 400 K-12 highly qualified teachers with a minimum of 3 years of teaching experience serving in private, public, or charter schools in this urban area are members. The executive director and RIST's board of directors gave me permission to implement the study due to their desire to enhance their current programming. The goal of the organization is to increase its level of service and programming to its members and the students within the region. To join the organization, a teacher member must nominate a teacher candidate for membership; the nominated teacher receives an invitation to apply to become inducted. Applicants must demonstrate their level of engagement within the community, their classrooms, and their peers. Following the application process, if accepted, they join the "new class" for a weeklong professional development session and collaboration with their peers.

Research Questions

This study answered the following research questions:

1. What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?

2. What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?

Research Instruments

The survey instrument, the TPSA, was given electronically via email and consisted of 18 statements revealing the participants' technology self-efficacy, confidence level, and progress toward proficiency when addressing distance learning during COVID-19. The survey has 18 statements that begin with the phrase, "I feel confident that…," with participants stating their level of agreement on a 5-point Likert-type scale from the following four domains of proficiency: (a) electronic mail, (b) the Internet or World Wide Web, (c) integrated applications, and (d) integrating technology into teaching. The initial design was created to capture the four domains reflected in the International Technology in Education (ISTE, 2021) national educational technology standards for teachers (Ropp, 1997).

The construct and content of the TPSA were reviewed for validity, which showed the domains of 506 in-service teachers. The assessment phase was modified to include "during COVID-19 crisis," with questions relating to the application of technology. During the qualitative research process, a focus group was used to glean deeper into the participants' experiences with professional development and technology. I used Zoom due to the current community being impacted by COVID-19 restrictions for indoor gatherings. To identify possible themes, the participants discussed perceptions about their experience with distance and hybrid learning, RIST professional development experiences, and the pandemic's impact on their technology self-efficacy. The focus group questions encompassed six questions created by Slutsky (2016; see Appendix C) with some modifications to include the experience with the organization. The participants were assessed on their level of participation in RIST professional development

opportunities, which was acquired from RIST's executive director (see Appendix D). The information acquired from the focus group was used to respond to the research questions to achieve a deeper understanding of the potential themes via Zoom. This information will assist the RIST participants in the amplification of their experiences and beliefs to share openly.

Research Procedures

The TPSA survey was administered electronically to all RIST teacher members via the organization's email listserv during the spring semester of the 2021–2022 school year. The email included the study overview, purpose, and secure link to the Qualtrics survey. Additionally, the security of the data acquired was explained in the email to reassure the protection of their privacy. The RIST teacher members had an expected return date of 1 week later. A reminder email was sent 2 days prior to the deadline to remind potential participants to submit the survey. Participants were informed of their rights to end their participation at any point during the study's implementation. Within the survey, they were asked to participate in the Zoom focus group portion of the study by providing a valid email address as confirmation. The goal was to acquire an equal number of participants from RIST's membership of private, charter, and public schools to participate in the focus group phase of the study based on their technology efficacy level. The Zoom focus group was recorded, facilitated by me, scheduled to last no longer than 1 hour, and then transcribed by the Zoom platform. Participants were reminded of the option to exit the survey and focus group. The transcribed qualitative data acquired from the focus group was reviewed for accuracy and then coded using the Quirkos program to analyze any emerging themes. Using multiple data sources, the quantitative survey and

the qualitative information from the focus group captured and sorted via the Quirkos program, a browser-based application, offers a more robust view into the elements impacting technology efficacy with distance learning during the COVID-19 pandemic by K-12 teachers.

Data Analysis Plan

Different techniques were utilized to analyze and decipher all information gathered. As indicated by Suter (2011), qualitative research, in the entirety of its intricate plans and techniques for information examination, is guided by the philosophical suppositions of subjective request: The numerous "real factors" experienced by the actual members—the "insider" points of view—should be considered to comprehend an unpredictable marvel. The goal of the qualitative examination was to help uncover arising topics, designs, ideas, bits of knowledge, and understandings (Patton, 2002; Suter, 2011). Information investigation in this research endeavored to find the subjects and examples that clarify the truth of educators (Slutsky, 2016).

I secured permission to send more than 400 members of RIST the invitation to participate in the electronic version of the TPSA survey by RIST's board and executive director during the second semester of the 2021-2022 school year. A timeframe of 1 week was given to complete the Qualtrics survey by RIST members. The survey was given through an anonymous link to ensure no identifying information was linked to the responses. Once the survey deadline had expired, only three participants volunteered for the focus group portion of the study. I had the director of the organization resend the electronic survey invitations to solicit additional members to submit the survey and participate in the focus group. The survey results of 33 members were uploaded to SPSS,

but due to the low participation, the data did not meet the requirements for inferential analysis. Descriptive statistical analysis was selected to provide the results for this study. The focus group was conducted, recorded, and then transcribed via Zoom. The focus group took place via Zoom due to the COVID-19 restrictions still in effect for large crowds gathering in the community. The recorded discussion was transcribed by the Zoom application, an advanced speech recognition software with a proprietary algorithm that captured the participants' responses and converted them into text transcription. The TLS 1.2 encryption and secure servers will protect the data and then be deleted in accordance with the research protocols established for the university. I manually reviewed the transcript several times to ensure its accuracy. The transcribed data were imported to Quirkos (2021), a browser-based program for coding to identify the prevalent themes by identifying recurrent words and phrases used by the participants to be categorized and coded. The encrypted software does not collect information or data from the projects processed. The software places selected text within color-based icons for visual enhancement. Once themes are coded and categorized, the data analysis was conducted to compose a narrative of the combined information regarding the participants' perceptions about the elements impacting their technology self-efficacy and online learning during COVID-19.

The two research questions, the survey instrument, focus group questions, and the data types I collected were related to sources. I affiliated the research questions with the data collection methods outlined in Table 1.

Table 1

Research Alignment Table With Data Collection Methods

Research questions	Instruments	Data collected	Method of analysis
1. What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?	Demographic Items 2-9	Quantitative	Descriptive statistics using SPSS: measures central tendency, frequency, mode, and mean
	Likert Survey Question 18	Quantitative	
	Focus Group Questions 3, 4, 5, 6	Qualitative	Descriptive analysis of themes
2. What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?	Demographic Items 2-9	Quantitative	Descriptive statistics using SPSS: measures central tendency, frequency, mode, and mean
	Likert Survey Questions 1, 10-17	Quantitative	
	Focus Group Questions 1, 2, 3	Qualitative	Descriptive analysis of themes

Role of the Researcher

As the researcher, I am a teacher in an urban school district in the southeast region of the United States. As a member of the RIST organization for almost a decade, I have been afforded the opportunity to have access to a diverse group of highly qualified educators. The organization provides varying levels of support to its members to help retain them in the educational field.

When the COVID-19 pandemic impacted the world, RIST reacted with a series of professional development opportunities to assist teacher members with distance learning and student engagement via quarterly Zoom sessions to offer support during this challenging time. This series was implemented with the teacher's voice in mind due to

their needs, which led to this exploration of adult learning and teacher technology efficacy.

Limitations of the Study

One limitation of this study is the teacher community organization, RIST. There is just one chapter in the urban region with a membership of just over 400 highly qualified teacher members. The second limitation is the potential for researcher bias. As a member of the teacher community organization RIST, I served as the facilitator for the interviews, which could be a limitation to the study due to potential bias. The third limitation is the small sample due to low participation from the organization.

Delimitations of the Study

The study involved a diverse group of highly qualified teachers from a region in the southeast area of the United States. All participants have a minimum of 3 years of teaching experience and are considered highly qualified; however, RIST has a limited number of male members. Their current work locations may be in a charter, private, or public school near a large urban city. The results could serve as a catalyst for a more comprehensive study with teachers and other stakeholders within various school types.

Conclusion

This study aimed to examine and amplify those elements impacting K-12 teachers' technology self-efficacy while implementing distance and hybrid learning during a health crisis, specifically COVID-19. Through this amplification, the gaps in preservice, in-service, and RIST learning opportunities were highlighted to give the organization data about their membership to provide their teachers the assistance needed to hone skills to enrich adult learning opportunities. By applying the andragogy theory

framework to the elements impacting teachers' technology self-efficacy, the reassessment of educational programs and professional development for teachers may transform. The enhancement of training may transfer over into their respective classrooms to bring higher achievement for their students, especially in the distance or hybrid learning environment, should they remain in place going forward in the educational future.

Chapter 4: Results

Introduction

This mixed methods research study aimed to examine the elements impacting K-12 teachers' technology self-efficacy while implementing distance learning during a global crisis, specifically the COVID-19 pandemic. This examination applied the androgyny theoretical framework. To promote a valid and reliably accurate finding, I employed various procedural steps to complete the data collection. Validity serves as one of the strengths of qualitative research and is based on identifying the findings' accuracy from the standpoint of the researcher, the participant, or the readers (Creswell & Miller, 2000). Creswell (2014) posited that researchers applying different data sources of information should be triangulated by examining the sources of evidence and using them to build a coherent justification for themes. If themes are established based on collecting many sources of data or viewpoints from participants, this process can be considered to add to the validity of the study. Creswell and Miller (2000) stated that the researcher ensures a drift in the codes or shift in the meaning of the codes does not occur by comparing data with the codes consistently at 80% for adequate reliability.

The results of the data amplified the gaps in technology learning opportunities, which may provide current and future teachers the assistance needed to hone skills to enrich student learning when using distance learning platforms. When reporting the results, a variety of narrative forms like tables and diagrams help provide insight into teacher education programs; professional development within school districts; and, more specifically, teacher organizations within the community.

Research Questions

This study answered the following research questions:

1. What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?

2. What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?

Technology Self-Efficacy Survey

Data Collection

The study was completed during the spring semester of the 2021-2022 school year. I conferred with the director of RIST to determine the organizational needs and discussed the optimal timeline to send the email to the teacher members by applying the convenience sampling process. While convenience sampling may limit the generalization of the findings, the data yielded initial insights that might help guide the design of teacher learning experiences (Trust & Whalen, 2020).

I converted the TPSA survey into an electronic form using the Qualtrics survey distribution system. Qualtrics, a web-based survey tool, is used to design, send, and analyze surveys. The RIST members received the survey via email using an anonymous Qualtrics link (see Appendix E). They were initially given 1 week to submit their surveys and provide their email address should they desire to volunteer for the focus group. Members were sent a reminder email 2 days prior to the survey deadline. Due to low participation, an additional email was sent to the member, and the survey remained open for an additional 2 weeks. The director stated she was not surprised with the response

rate, as the "previous email response level was below 20%" on average. The COVID-19 pandemic also played a role in the low participation, as teachers were working more on their computers and were overwhelmed with their workload. As a result, I sent an additional email to members I knew to encourage their participation with the survey and the focus group. The survey data are kept in a secure, password-protected electronic file to maintain the privacy of the RIST participants. School types identified the population (N=31) and the participation level within the survey. The survey participation level was private school (n=9), public school (n=18), charter school (n=2), other (n=1), and no response (n=1). The survey population and participation are displayed in Table 2.

Table 2

Survey Population and Participation

Survey recipients	Survey respondents	Percent participation
Private	9	29
Public	18	58
Charter	2	7
Other	1	3
Did not respond	1	3
Total population	31	100

Of the 400 teacher members who received the survey invitation, the response rate for the total population in this study was approximately 8% (31 of 400). Public school members were the most represented at 58.1%, while private school members were at 29%.

Two days prior to the survey deadline, participants received an email that expressed my appreciation to those who completed the survey and who had volunteered for the focus group by providing their email addresses. The email also reminded the remaining members of the significance of the research and the pending deadline (see

Appendix E). I collected the electronic data for quantitative analysis of demographics, the

Likert scale questions, and the email addresses of the focus group volunteers. An

additional email was sent to the teacher members when less than six members had

volunteered for the focus group, which was the minimum number to conduct a viable

focus group (Creswell, 2014). The focus group was held when I acquired additional

participants via Zoom using open-ended questions for the qualitative data. The recorded

Zoom meeting was automatically transcribed, and I reviewed the transcription for

accuracy. I coded the data via Quirkos for themes and trends. Statistical Package for the

Social Sciences (SPSS Version 26) was used to categorize the Likert scale items. I

analyzed the data and documented findings using descriptive statistics to determine the

elements impacting teacher technology self-efficacy during COVID-19. The descriptive

statistics provided sample characteristics, frequency, and percentages of the members'

experiences.

Results of the TPSA

Survey Item 1 included an 18-item Likert scale for the TPSA, categorized by

domains, and the remaining survey questions gathered demographic data. The domains

included email, teaching with technology, integrated applications, and the World Wide

Web. The Likert scale had possible ratings of strongly agree=SA, agree=A, mildly

agree=MA, strongly disagree=SD, disagree=D, and mildly disagree=MD. More than half

of the 31 participants strongly agreed in all four domains regarding their overall

confidence level with technology. Specifically, the percentages shown for strongly agree

in the domains were 79% level of confidence for using email, 62% level of confidence

for teaching with technology, 69% level of confidence for implementing integrated

applications, and 71% level of confidence for using the World Wide Web. Teachers had

an overall 62% level of confidence teaching with technology which is the center of the

participants' actual career tasks, and they may need a bit of support because it will impact

their classroom. The TPSA email domain total is displayed in Table 3.

Table 3

TPSA Domain Email Total

Teacher level of confidence	Frequency	Percent
A	15	10
D	4	3
MA	8	5
MD	2	1
SA	123	79
SD	3	2
Total	155	100

Note. A=agree, D=disagree, MA=mildly agree, MD=mildly disagree, SA=strongly

agree, SD=strongly disagree.

The frequency and percent calculations for the domain table represents the total

number of responses for questions 1 through 5 from the TPSA survey. A large number of

members, 79%, strongly agree that they have a high confidence level interacting with the

email domain overall. This would align with the increase of virtual communication

experienced by teachers over the past 2 decades, especially in the work environment.

The TPSA teaching with technology domain total is displayed in Table 4.

Table 4

TPSA Domain Teaching With Technology Total

Teacher level of confidence	Frequency	Percent
A	30	19
D	3	2
MA	12	8
MD	12	8
SA	96	62
SD	2	1
Total	155	100

Note. A=agree, D=disagree, MA=mildly agree, MD=mildly disagree, SA=strongly agree,

SD=strongly disagree.

The frequency and percent calculations for the domain table represents the total

number of responses for questions 6 through 11 from the TPSA survey. Within this

domain, only 62% of the members strongly agree and 19% agree with their level of

confidence teaching with technology, which may have impacted the transition to online

and hybrid teaching environments. Confidence breeds confidence, and the students of

these educators would benefit from an increased confidence level with the tools used in

the learning space for academic success.

The TPSA integrated applications domain total is displayed in Table 5.

Table 5

TPSA Domain Integrated Applications Total

Teacher level of confidence	Frequency	Percent
A	18	14
D	1	1
MA	10	8
MD	6	5
SA	85	69
SD	4	3
Total	124	100

Note. A=agree, D=disagree, MA=mildly agree, MD=mildly disagree, SA=strongly agree,

SD=strongly disagree.

The frequency and percent calculations for the domain table represents the total number of responses for questions 12 through 14 from the TPSA survey. The integration of applications such as Google docs and Microsoft applications show a strong confidence level 69% selecting strongly agree and 14% selecting agree by the teacher members. A total of 9% disagreed with their level of confidence, which may indicate a need for additional training in order for them to be used in their classrooms effectively.

The TPSA World Wide Web domain total is displayed in Table 6.

Table 6

TPSA Domain World Wide Web Total

Teacher level of confidence	Frequency	Percent
A	14	12
D	4	3
MA	10	8
MD	5	4
SA	88	71
SD	3	2
Total	124	100

Note. A=agree, D=disagree, MA=mildly agree, MD=mildly disagree, SA=strongly agree, SD=strongly disagree.

The frequency and percent calculations for the domain table represents the total number of responses for questions 15 through 18 from the TPSA survey. Under the World Wide Web domain, the majority of the members (71%) expressed that they strongly agree with their confidence level when interacting in this area, while there was an overall 10% who disagreed with their level of confidence.

The survey instrument collected demographic and background information regarding the participants. The information included years in education, professional development attended, gender, content area taught, grade level, school type, and

ethnicity. Of the 31 responses, one participant did not fully complete the survey and is

shown in the tables as "unknown" for documentation purposes.

Survey Question 3

Survey Question 3 collected information related to the technology-based RIST-

hosted professional development opportunities. The professional development

opportunities members attended were technology-based. The presented opportunities

were displayed in a drop-down format. The professional development is shown in Table

7.

Table 7

Survey Question 3 RIST Professional Development

	Frequency	Percent
NC Re-Licensure digital learning	1	3
Dr. Brian Housand sessions	13	43
Raspberry Pi3	1	3
Virtual student engagement	1	3
Other	14	45
Unknown	1	3
Total	31	100

While the most attended session was designated "other," the sessions attended

suggests the sessions were not technology-based. The next highest attended session was

selected by 43% of the survey participants. Most participants (13) attended sessions

conducted by Dr. Brian Housand. The sessions offered a variety of technology-based

topics that were provided more than once per calendar year to the RIST organization and

its members. All sessions provided a certificate of participation for members to receive

technology professional development credit for licensure potentially.

Survey Question 4

Survey Question 4 collected demographic information related to the years

members worked in education, as displayed in Table 8.

Table 8

Survey Question 4 Years in Education

	Frequency	Percent
6-10 years	2	7
11-20 years	13	42
20-30 years	14	45
More than 30 years	1	3
Unknown	1	3
Total	31	100

Of 31 responses, 48% had 20 years or more in education and 42% had between

11-20 years of experience.

Survey Question 5

Survey Question 5 collected demographic information related to the grade level

the participants taught, as displayed in Table 9.

Table 9

Survey Question 5 Grade Level

	Frequency	Percent
Elementary	8	26
Middle	7	23
High school	14	45
Other	1	3
Unknown	1	3
Total	31	100

Of 31 responses, 42% worked in education from 11 to 20 years, and 45% worked

in education from 20 to 30 years. Almost half (45%) of the participants taught at the high

school level, with 26% at the elementary level and 23% at the middle school level. The

remaining 6% were unknown or other due to working in a different capacity in education.

Survey Question 6

Survey question 6 collected demographic information addressing the content area where each of the 31 participants teaches. The content area is displayed in Table 10.

Table 10

Survey Question 6 Content Area

	Frequency	Percent
CTE	3	10
English/ELA	9	29
Math	3	10
Science	5	16
World languages	2	7
Content area not listed	8	26
Unknown	1	2
Total	31	100

Of the 31 participants, 29% taught English/language arts, which when taking into consideration the combined experience level and level of confidence, indicates English teachers are the most represented. The next most significant percentage (26%) did not have their area listed, and science educators came in at 16%. The remaining content areas representing CTE, math, and world languages were at 10% for representation as participants.

Survey Question 7

Survey Question 7 collected demographic information addressing the school type where each of the 31 participants teaches. The school types for the participants are displayed in Table 11.

Table 11

Survey Question 7 School Type

	Frequency	Percent
Charter school	2	7
Private school	9	29
Public school	18	58
Other	1	3
Unknown	1	3
Total	31	100

Public school teachers were 58% of the respondents, while private school teachers were 29% and charter school teachers were 7% of the responses collected during the survey.

Survey Question 8

Survey Question 8 collected demographic information addressing the gender of the participants, as displayed in Table 12. One selection is marked unknown due to the participant not completing the entire survey.

Table 12

Survey Question 8 RIST Gender Participation

	Frequency	Percent
Unknown	1	3
Male	3	10
Female	27	87
Total	31	100

Of the 31 participants, 87% were female, 10% were male, and 3% were unknown due to the participant not completing the entire survey. Demographically, women outweigh the men regarding RIST membership and participation. This is representative of the average representation of personnel within school environments, as there are typically more women teachers in American classrooms overall.

Survey Question 9

Survey Question 9 collected demographic information addressing the ethnicity of the 31 participants, as shown in Table 13.

Table 13

Survey Question 9 RIST Ethnicity

	Frequency	Percent
Black or African American Non-Hispanic	11	36
Hispanic or Latino	1	3
Multiracial or Biracial	1	3
White or Caucasian, Non-Hispanic	17	55
Unknown	1	3
Total	31	100

Of the 31 participants, more than half (55%) were Caucasian, 36% were African American, and 3% were Hispanic/Latino, Multiracial, and unknown. For the remaining TPSA questions, the majority (over 50%) strongly agreed that they were capable of producing slide presentations, composing emails and documents, and essentially the basics of technology. Items such as creating newsletters, spreadsheets, or extensive application manipulation did require participants to apply more time to the tasks.

Qualitative Data Analysis

Using open-ended questions for the focus group, I collected the experiences and perceptions of the six participants via Zoom. On the Zoom platform, I enabled the recording and transcript functions to document the participants' responses. Following a manual review of the transcript to ensure accuracy, I read the entire transcription to get an overall sense of the data. I documented initial notes to capture initial emerging themes. The raw data in the form of the transcript were uploaded to the Quirkos program to complete the next step in the coding process using a cyclical process to synthesize and

analyze the patterns or trends within the text for content analysis.

The content analysis examined the text to identify the presence of specific words, subjects, patterns, or ideas presented in transcripts that were documented. Utilizing content analysis, researchers can evaluate and dissect the presence, implications, and connections of certain words, subjects, or ideas. There are various uses such as discovering patterns in text and analyzing focus group interviews and open-ended questions to complement quantitative data using the content analysis method (Schreier, 2012). Following the general steps to complete a conceptual content analysis by choosing general themes to code and allowing the flexibility to add additional categories through the coding process, I identified phrases, sentences, and words that were initially related to self-efficacy, professional development, and technology challenges to categorize the focus group text that I had uploaded to the Quirkos program. The program uses round, colored visual icons that can be dragged and dropped within the platform as themes are labeled and found within the transcript. An additional three rounds of reading through the transcript provided the opportunity to add collaboration and attitude to my categories for organizational coding purposes. The codes assigned to a category were shortened spelling versions of the predetermined words used in the focus group, and then as additional topics emerged, they were assigned a colored icon to maximize the coherence. These qualitative data were saved to the Quirkos secure cloud server.

Results From Focus Group

Focus Group Question 1

Focus Group Question 1 was, "What factors do you attribute to your self-confidence when using technology with distance/hybrid instruction during the COVID-19

crisis?" Sample responses and key ideas are displayed in Table 14.

Table 14

Focus Group Question 1

Participant	Sample response	Key ideas
R1	"I was not very confident."	• Learning curve • Stressful at times
R2	"I felt pretty comfortable with like basic technology."	• Several professional development sessions
R3	"I was really comfortable."	• Not scary when COVID hit • New strategies
R4	"I was used to hands-on activities in the classroom."	• Transformative resistance
R5	'We were forced to go to technology in 2013."	• Skype • Zoom
R6	"I think that…right now, I'm more comfortable using technology than I was before COVID."	• Same platforms • Not afraid

Many of the focus group participants were comfortable with the transition to online instruction and using technology. Participant B stated, "two years prior to COVID, we'd been fully using those platforms, so everyone was comfortable." Having that previous experience with their team members helped to assist with their confidence level. However, Participant D attributed their confidence level to training: "I did have the benefit of being able to receive a lot of training, which improved my skillset." Participant A expressed, "I'm not afraid of it [technology], so I'll try something new and if I screw up…I'm like okay, well I can just start again." Even those who were not initially comfortable or resistant found balance with the learning curve. They attributed their perspective to the unpredictability that exists within the education field.

Focus Group Question 2

Focus Group Question 2 was, "How often do you experiment or take the time to learn new technology with your distance/hybrid instruction?" Sample responses and key ideas are displayed in Table 15.

Table 15

Focus Group Question 2

Participant	Sample response	Key ideas
R1	"When we were…I was looking several times a week."	• Engage kids • Self-motivation
R2	"Depends on the instructional activity."	• Student engagement
R3	"I definitely participated in a lot of PD."	• Engagement • Certifications
R4	"I tried to learn about the new technology."	• District mandate
R5	"I was an influx of resources…I had to filter."	• What's best for students
R6	"Kind of required me to go a lot deeper into technology."	• Student access

As displayed in Table 15, the participants were open to learning technology, especially if it would engage their students. Participant C stated, "I don't mind taking [technology] for a test drive…sometimes we crash and burn, but I'm okay with that." Participant B stated, "I'm really looking at how you can engage the students." Overall, most participants sought out resources to use in the classroom and appreciated the credit hours and certifications for professional development sessions that could be added to their resumes. Participant D exclaimed, "You have to have your own self-motivation to go and find these digital platforms and train yourself, unfortunately and watch YouTube videos."

The state has mandated technology professional development for the renewal of their teacher license, but they and local districts did not provide consistency regarding the type of sessions that would be beneficial to their professional growth or the growth of their students. All were concerned about engaging the students and reaching those who did not have access to technology or resources that would assist with reading skills.

Focus Group Question 3

Focus Group Question 3 was, "How has your collaboration with RIST members or other educators motivated your technology usage during the COVID-19 crisis with distance/hybrid instruction?" Sample responses and key ideas are displayed in Table 16.

Table 16

Focus Group Question 3

Participant	Sample response	Key ideas
R1	"I spent a lot of time with Ms. X."	• Motivational
R2	"I don't really collaborate much outside of my school."	• Seeing other teachers
R3	"I reached out to RIST, the other core members, and my PLC."	• Group sessions • Everyone prepared
R4	"I haven't been able to connect with RIST members."	• Access
R5	"I have some pretty dynamic young teachers in our crew."	• PLC
R6	"Working with Ms. X was really helpful to keep me motivated through COVID."	• Choice professional development

Collaboration was used by most of the participants, as shown in Table 16. All acknowledged the benefits of collaborating, but they expressed that time did not allow it to occur effectively. Participant A shared, "I relied upon experimentation help for gurus."

Some used it to motivate themselves during the pandemic to increase their knowledge

and skillset. Sharing information was a way to ensure no teacher would be left behind if a

colleague needed assistance. Given the COVID situation, most utilized the Zoom

platform to gather and share resources. Others conveyed, "I have been relying more on

district specialists." Leaning into support provided by sites and districts appears to be the

preferred method of collaboration during this time period.

Focus Group Question 4

Focus Group Question 4 was, "What barriers or supports have you experienced

with RIST technology professional development regarding distance/hybrid instruction

during the COVID-19 pandemic?" Sample responses and key ideas are displayed from

participants in Table 17.

Table 17

Focus Group Question 4

Participant	Sample response	Key ideas
R1	"Having differentiating technology usage workshops."	• Good instruction • Certificates
R2	"We had a presenter who actually talked about the platform but gave a lot of time to work on it."	• Practice • Use in the classroom
R3	"Self-care and technology strategies; that was very, very helpful."	• Relevant • Adaptable
R4	"Some on resilience was very helpful."	• User friendly
R5	"Supportive of one another."	• No one left behind
R6	"Very useful to give those hands-on time to a lot of the teachers."	• Beneficial • Able to practice

All participants appreciated the ongoing support and programming provided by

RIST, as shown in Table 17. Participant E shared, "the past two years…different people that led workshops that were helpful," while Participant A stated, "even if you are a veteran teacher, it doesn't mean you can't take an old skill...and repurpose it to learn." Participants C and D said, RIST "needs to do a better job of giving different levels of PD for teachers." A same-size-fits-all approach does not benefit learners, especially adults who have experienced professional development throughout their careers. The majority have experienced and shared their level of support as well as pain points associated with RIST professional development.

Focus Group Question 5

Focus Group Question 5 was, "What strengths or areas of improvement are needed for RIST technology professional development sessions?" Sample responses and key ideas are displayed in Table 18.

Table 18

Focus Group Question 5

Participant	Sample response	Key ideas
R1	"If they (RIST) know the technologies… being used by the district…training can be specific."	• More relevant sessions
R2	"I feel like we are behind the ball."	• Time to practice
R3	"Needs to do a better job of giving different levels of PD."	• differentiation
R4	"They need to really revamp what they are doing with the technology PD."	• Classroom relevant
R5	"I wish they would have had more training to certification."	• certification
R6	"Unfortunately going back to classroom management and data needed since COVID."	• Diverse offerings

Even though participants shared their appreciation for the level of support, they did discuss the need for differentiated professional development. The participants agreed that presenters need to offer time to practice any new tool and not to be left to figure out a platform on their own. Participant C shared, a "revamping of attitude maybe on how technology should be used in education." Overall, participants conveyed a need for education to experience an overhaul in their approaches to learning as shown in the table.

Focus Group Question 6

Focus Group Question 6 was, "How would you describe your overall attitude and experience using technology with distance/hybrid instruction during the COVID-19 crisis?" Sample responses and key ideas are displayed in Table 19.

Table 19

Focus Group Question 6

| Participant	Sample response	Key ideas
R1	"It was a shock, it was a shift because it was a learning curve for me to use it 100% to reach students."	• Shift • Student engagement
R2	"Perseverance through that shift because not a lot the resources we're still able to use."	• Shift • Many resources
R3	"It was a paradigm shift…however, I feel it was very beneficial in the long run."	• Shift • Positive outlook
R4	"It was very stressful…I had never used Canvas."	• Stressful
R5	"I feel very accomplished in my skillset…this is a time for you to be creative."	• Creativity • Accomplished
R6	"It was stressful at times…it helped me to grow stronger."	• Stressful • Growth

Although the transition was stressful initially, most participants experienced a sense of accomplishment and growth in areas within their control as teachers. Challenges out of their control were Zoom bombers, student attendance, technology glitches, and black screens during online instruction. Participant D stated, "All of my resources kind of looked like all the lipsticks you buy, like I have too many resources." Participant E said, "I was comfortable using it for myself, but making sure that I'm using it to reach our students that was just a learning curve for me." This learning curve feelings seemed to be the consensus for the majority of the participants. All have tried to maintain a positive outlook during and following the shift to online instruction. Finding ways to minimize the stress for students and themselves is at the forefront of their concerns.

Themes of Qualitative Data

Following the transcription of the data and the collection of the qualitative data from the focus group transcripts, I read each response and assigned a category from the responses provided by the focus group participants. The most significant response categories that served as the themes that emerged from this research were experimenting with technology, technology self-confidence, collaboration, and professional technology development.

Figure 3

Qualitative Data Themes
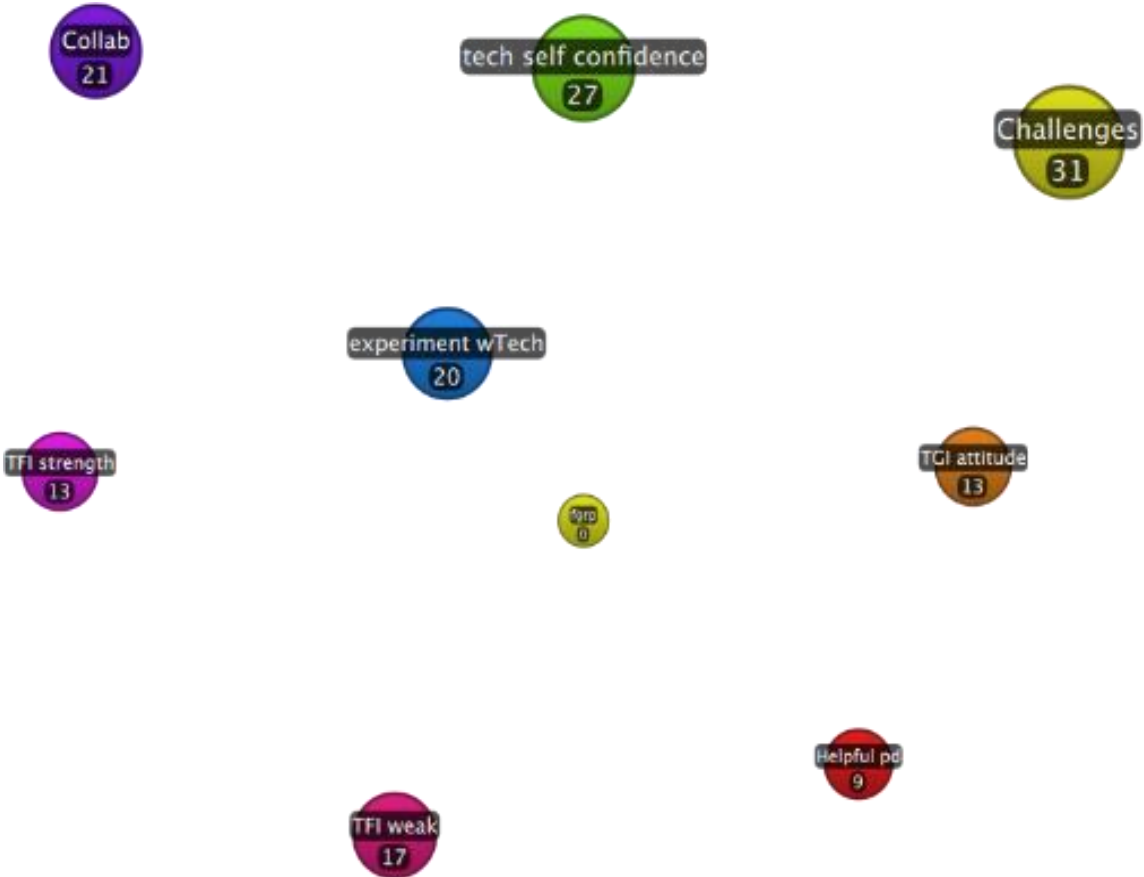
Note. Qualitative Data Category Themes (Quirkos, 2021).

      The responses were coded using the content analysis method and then synthesized into a table. The themes that emerged from this research were experimenting with technology, technology self-confidence, collaboration, and technology professional development. The themes are displayed in Table 20.

Table 20

Themes of Qualitative Data

Theme	Sample focus group response
Experimenting with technology	"We usually see some new stuff that I don't mind taking for a test drive…sometimes we crash and burn, but I'm okay with that."
Technology self-confidence	"I was comfortable using it for myself but making sure that I'm using it to reach our students that was just a learning curve."
Collaboration	"See[ing] how some teachers were able to pick it [tech] up very easily and then how others were having challenges."
Technology professional development	"Incorporate more presenters who allow more work time with the tool."

Time appeared as an issue for participants, from possessing enough time for experimenting with technology and guided assistance to technology professional development that does not waste their time and includes differentiation. They are open to learning, but it is a matter of how the learning happens for them, which will ultimately impact their students.

Conclusion

This study examined the elements impacting teachers' technology self-efficacy with distance learning during the COVID-19 pandemic. An electronic survey was distributed to RIST members to secure their perceptions about their comfort level with technology. Additionally, a focus group was held with six volunteer members of the RIST organization. The data collection method permitted me to amplify everyday experiences and themes within this regional organization. The demographic and quantitative data collected revealed the differences between the participants, while the

qualitative data highlighted the potential connections with their responses.

Chapter 5 reveals the interpretation of the findings as they relate to the research questions and research literature. Delimitations, limitations, implications, and recommendations for further research are addressed.

Chapter 5: Discussion

Introduction

A typical K-12 educator regularly includes creating content, planning, teaching the content, and a host of other duties. The quick transmission of the COVID-19 virus in late 2019, which adversely impacted all parts of society, including eduction, caused a considerable change in the education of students and the growing experience of teachers. Many schools were closed, and educators worked from home to provide their classes online. In March of 2020, the governor of North Carolina implemented an executive order for all residents to stay at home (*Executive Order No. 121 | NC Gov. Cooper*, 2020). Although various schools and colleges might have utilized some web-based education previously, many were unprepared for the unexpected need to move all classes to the web, particularly in the middle of the semester. Such a transition to online learning worried many educators (Ulla & Perales, 2021), plus some instructors were new to a full online teaching situation. Barbour (2012) and Harrison (2016) recognized that although K-12 online learning is known in the United States, there is still a shortage of professional development programs that help instructors teach online. Educators were caught off guard and came up short with their abilities to do online instruction.

In this study, self-efficacy played a role in teachers' experiences with technology and its implementation, especially during the COVID-19 pandemic. It was quite challenging to entice teachers to participate due to Zoom fatigue, physical and mental exhaustion due to the additional duties and processes that they had to endure during this unprecedented time. Several requests for their participation did not yield the necessary numbers to capture the robust results anticipated.

Professional technology development must not be taken for granted by the leaders and administrators of school systems if practical training for educators serving the students of the world is of concern. This mixed methods research study examined the elements impacting K-12 teachers' technology self-efficacy while implementing distance and hybrid learning during a global crisis, specifically the COVID-19 pandemic. Currently, with the increasing numbers for the spread of new strains of the Covid-19 virus occurring, uncertainty for the future continues to plague communities. Concrete plans in many school districts across America does not exist should another transition to online learning occurs. If such a transition were to occur, history may repeat unnecessarily.

Research Questions

This study answered the following research questions:

1. What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?

2. What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?

Interpretation of Findings

Technology Professional Development

The first research question asked, "What effect does a professional association's technology training have on its teacher members' distance learning confidence level during the COVID-19 crisis?" This question was addressed using Demographic Question 20 and Focus Group Questions 3-6. All teacher participants indicated that they felt

supported by the RIST organization with the amount of professional development

provided. However, they desired more when it came to technology tools and sessions

about them. They needed technology tools relevant to their content and time to practice

with the technology tool, which would make it andragogical in practice. At the same

time, the facilitator was present to offer guidance should teachers encounter challenges

with tools that could be used in the classroom immediately and provide continuing

education credit towards their licensure. Additionally, some teacher participants indicated

the need for differentiated sessions of professional development due to the skill levels of

the teacher members. Some teachers may have more experience with different tools,

while others may be at the beginning stages or will require additional support from the

facilitator or other members.

The data for this research question indicate a need for differentiated hands-on

technology training, with a trainer who offers real-time support, and the tool or activity

can be used in the classroom immediately. Relevance, the problem-based content, and the

need to work through mistakes are the foundation for the adult learning theory or

andragogy (Knowles et al., 2005; Ni & Lu, 2020; Thorndike, 1991). Bandura (1977)

found self-efficacy to be significant regarding perseverance when people with a high

amount of self-efficacy encountered challenges, which may account for the responses

received from the focus group. However, when people had low self-efficacy and had the

same challenges, they would have some feelings of hopelessness. According to

Linderman and Knowles, adults need relevant learning and self-direction as well as a

need and interest to motivate their learning (Knowles et al., 2005). The participants could

benefit from professional development, which is infused with adult learning aspects to

increase their comfort level and desire to implement technology in their classroom while reducing any fear of experiencing a lack of preparedness.

Technology Self-Efficacy

The second research question asked, "What effect does technology self-efficacy have on K-12 teachers' distance learning during the COVID-19 crisis?" This question was addressed with the Likert scale survey and Focus Group Questions 1-3. The nature of the RIST association is to recruit high-performing teachers in the region, and most of the study participants expressed a high comfort level with technology. While they expressed some challenges such as stress, feeling overwhelmed, encountering Zoom bombers (individuals who joined a meeting to disrupt the session), black Zoom screens (students who would not turn on their camera), student attendance with the distance learning, and just the amount of extra work or time taken away from their day due to teacher absences, they had an overall positive outlook on the COVID-19 situation and the future of education.

Bandura (1977) posited that for people to experience perseverance, they need four sources of influence: mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal. The overall results of the Likert scale quantitative data suggest that most participants have strong self-efficacy. A few did express some resistance, but with verbal persuasion and vicarious experiences with RIST members, their professional learning communities, or school site colleagues, they could embrace the technology tools or at least have the perseverance to try even if mistakes were made. Should history repeat with new strains of COVID-19, the outcome may be more dire than current leaders can address.

Limitations of the Study

There are a few limitations included in this study. First, I am a member of the RIST professional organization, which may lead to some bias. I facilitated the focus group via Zoom video. I established the protocols for the focus group process. I do not have the authority over the membership to guarantee a specific number of surveys returned or the speed at which they are returned. The anticipated number of RIST members participating in the survey and volunteering for the focus group did not occur. Several email attempts were made by the organization's director to contact RIST members to participate with no success, so the threshold to complete an inferential data analysis was not met. A descriptive analysis for both quantitative and qualitative data to yield the results of this study.

Delimitations

The study involved a diverse group of highly qualified teachers from a region in the southeast area of the United States. All participants have a minimum of 3 years of teaching experience; however, RIST has a limited number of male members. Their current work locations may be in a charter, private, or public school near an urban area.

Recommendations for Future Research

Based on the results of the study, I have the following recommendations for future research consideration.

Recommendation 1: Examine the Sample Participant Size

This study initially invited more than 400 highly qualified teachers who were members of the RIST organization, with only 31 participating. Having a small sample cannot definitively provide solid evidence for future implementation. Increasing the

sample to include all participants by district, state, geography, or even a larger teacher organization could help to identify the perceptions and experiences of those participants.

Recommendation 2: Examine the Professional Development Structure for Adults

I suggest a longitudinal study of andragogical-based technology professional development sessions to help determine how it may impact a larger group of teachers and their students. Before an educator can indeed be effective in teaching their students, they must receive adequate training that speaks to their needs and the needs of their students.

Implications for Practice

Effective Technology Training

Revising how current technology professional development is designed and implemented for teacher learners into andragogical-based programs may improve the current programs. Applying synchronous or asynchronous environments to engage and motivate teachers could be the change needed to change perceptions. Professional technology development should be accessible to all teachers at all levels, including administrators, to provide a sense of belonging to "not leave a teacher behind" when situations shift as they did during COVID-19. There are various strategies to implement professional development, such as CL, PDAs, and action research activities, to name a few.

Conclusion

The COVID-19 pandemic prompted a need for professional development to help educators in computerized settings. Jocius et al. (2022) stated that studies of virtual experiences have shown that fully online or hybrid models can effectively support educators' primary practice and develop close bonds with colleagues. The execution of

technology professional development has made little changes when the learner is an adult. With technology becoming a staple in people's lives worldwide, it would be remiss for educational institutions and business industries to ignore the changes occurring quickly. Following the spread of COVID-19 and the school shutdowns across America in the spring of 2020, educational institutions were in a difficult situation to convert to online learning within a matter of weeks. Teachers were unprepared to use technology tools effectively with this significant change.

This study amplified the perceptions and experiences of teachers within the RIST organization during this period, as well as effective opportunities for technology professional development that meets their needs in the classroom. While the overall attitude was one of perseverance and doing what was necessary to ensure their students were learning, nothing can prepare an individual more than practical technology teacher training made for them before it is needed. This change could impact students' engagement and academic success and the teachers' ability to collaborate with colleagues.

Researchers have found that some educators believed it would be best for them to participate in action research work as they could see enhancements in their professional content knowledge. However, others believed CL has produced many advantages for student learning. CL empowers teachers to emphasize academic and interactive skills in the students' growth opportunities, making this tool an incredible asset for educator practice and student learning. CL's constructive outcomes on students' academic and social learning cannot be denied. The educators' cooperation in a professional development program with an instructor group upheld the use of CL.

Additionally, PDAs have positively impacted some instructors. It was found that

some teachers' levels of need for PDAs and their frequency of participation in

collegiality-based PDAs have positive, significant effects on their attitudes towards

PDAs. Collaborative PDAs increase teachers' self-efficacy, motivation to teach, and job

satisfaction, positively affecting their sense of belonging and intention to stay. It does not

matter what strategy is selected if the strategy includes andragogy in the building block of

the program. Friederichs (2018) asserted that there are 100 billion neuron cells or

synapses in the human brain. These cells have enzymes, which make compounds,

proteins, and synapses, which are all essential for the nerve cells in the brain to speak

with each other. As the development of the neuronal network occurs, every creation

addresses an actual change within the mind. Each time new and useful knowledge is

gained—not each time we experience a new thing, yet rather each time learning happens

through a synaptic association—a small new "branch" structure in the cerebrum is

created (Friederichs, 2018).

PDA is needed at some level since the competencies among adult learning

professionals significantly impact the effectiveness of adult learning, which could impact

educators' students. According to Friederichs (2018), an actual change can occur by

associating new boosts (data) to a current neuron; consequently, the significance of

associating with related knowledge in our students. The method involved with learning is,

in a real sense, the actual demonstration of developing the neuronal network. At the point

when the brain finds an association with something we definitely know, the mind

processes it with a stronger signal versus a weak signal which creates a small or no

connection, so learning does not happen. When practice occurs, neurons are activated and

connections increase. This process makes the neurons efficient or where the learner

becomes proficient with a task with repeated practice (Blanchette Sarrasin et al., 2020).
The practice should happen in shorter time periods instead of hours of studying or
cramming; this allows the brain to access the strengthened connection and the neurons to
work better during the retrieval process for optimal learning.

Based on how the brain learns, the preparedness of adult learning practitioners to
apply andragogical-based content is a fundamental condition for high-quality adult
learning results with technology. The facilitators should discover a method of taking new
data and connecting it to something the student knows. Without that association, learning
is just not occurring. Several brain researchers identify the "adult brain" as starting at or
around age 23, past the age of a college student. Subsequently, providing learning content
for adults in a similar way you do, have, or would with younger learners, all things
considered, learning is not, as a matter of fact, occurring (Friederichs, 2018).

Before the COVID-19 pandemic, scientists and politicians examined the ways of
improving instructors' readiness for school crises like acts of mass violence and bomb
dangers. Now the world must adjust to the impact of COVID-19 that our educators,
students, and the whole educational system has endured for the past two years if concrete
measures are not considered and implemented for the intellectual future of the world's
children.

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Appendix A

Technology Proficiency Self-Assessment

TPSA Directions: Select the number that indicates your level of agreement with the following statements:
1=Strongly Disagree, 2=Disagree, 3=Mildly Disagree, 4=Mildly Agree, 5=Agree, 6=Strongly Agree

SD D MD MA A SA	"During Covid-19, I feel confident that I could…"
1 2 3 4 5 6	1. …send e-mail to a friend
1 2 3 4 5 6	2. ...subscribe to a discussion list or list serv
1 2 3 4 5 6	3. ...create an alias to send e-mail to several people at once
	4. ...send a document as an attachment to an e-mail
1 2 3 4 5 6	5. ...keep copies of outgoing messages sent to others
1 2 3 4 5 6	6. ...use an Internet search engine (i.e., Bing, Google, etc.)
1 2 3 4 5 6	7. ...create my own website
1 2 3 4 5 6	8. ...keep track of websites visited to return to them later
1 2 3 4 5 6	9. ...find primary sources on the Internet to use in my teaching
1 2 3 4 5 6	10. ...use a spreadsheet to create a pie chart of the proportions of the different colors of M&M's in a bag
1 2 3 4 5 6	11. ...create a newsletter with graphics and text in 3 columns
1 2 3 4 5 6	12. ...save documents in formats so that others can read them if they have different programs (i.e., RTF, text, etc.)
1 2 3 4 5 6	13. ...use the computer to create a slideshow presentation
1 2 3 4 5 6	14. ...write an essay describing how I would use technology in my classroom
1 2 3 4 5 6	15. ...create a lesson/unit that incorporates subject matter software as an integral part
1 2 3 4 5 6	16. ...use technology to collaborate with others who are distant from my classroom
1 2 3 4 5 6	17. ...describe five software programs or apps the I would use in my teaching
1 2 3 4 5 6	18. ...write a plan with a budget to buy technology for my classroom

19. How long have you been a fellow?

20. Which technology based professional development sessions have you attended by RIST? Choose all that apply. (See Appendix D)

21. **How long have you been in education?**

    3-5yrs/6-10yrs/11-20yrs/20-30yrs/more than 30yrs

22. **What grade level do you teach?**

    PreK-K/Elementary/Middle/High School/Other

23. **What is your content area?**

    Math/Science/ELA/Social Studies/CTE/Physical.Ed/World Lang/Special

    Ed./Content Area Not Listed

24. **Indicate the type of school where you work.**

    Public/Private/Charter/Other

25. **How would you describe yourself?**

    Male/Female/Non-Binary/Prefer not to say

26. **Which of the following best describes you?**

    Asian or Pacific Islander/Black or African American/Native American or Alaskan

    Native/White/Multiracial or Biracial/Race or ethnicity not listed

If you are interested in taking part in the optional 30-minute focus group that explores these same topics via Zoom, please provide your name and email address. If you are randomly chosen, more information about a time and date will be sent to you.

Appendix B

Focus Group Questions

1. What factors do you attribute to your self-confidence when using technology with distance/hybrid instruction during the Covid-19 crisis?

2. How often do you experiment, or take the time to learn a new technology with your distance/hybrid instruction?

3. How has your collaboration with RIST members, or other educators motivated your technology usage during the Covid-19 crisis with distance/hybrid instruction?

4. What barriers or supports have you experienced with RIST technology professional development regarding distance/hybrid instruction during the Covid-19?

5. What strengths or areas of improvement are needed for RIST technology professional development sessions?

6. How would you describe your overall attitude and experience toward using technology with distance/hybrid instruction during the Covid-19 crisis?

Appendix C

Interview/Focus Group Questions Permission

Re: Research Instrument

Aaron Slutsky <awslutsky@gaston.k12.nc.us>
Sat 5/2/2020 10:09 AM

To: Rochelle Stanley <rstanley3@gardner-webb.edu>

CAUTION: This email originated from outside of the Gardner-Webb.edu domain. Do not click links or open attachments unless you verify that the links and/or attachments are safe.

Yes, you have permission to reproduce the personal interview questions and focus group questions. You may also amend as you see fit. Best of luck to you.

Thanks...Aaron

On Fri, May 1, 2020 at 9:30 PM Rochelle Stanley <rstanley3@gardner-webb.edu> wrote:

Dear Dr. Slutsky,

I am a doctoral student at Gardner-Webb University completing a dissertation in Curriculum and Instruction. I am writing to ask written permission to reproduce the personal interview and focus group questions from your *Factors Influencing Teachers' Technology Self-Efficacy* for my research study. My research will focus on distance learning and teacher technology efficacy during the Covid-19 pandemic. My research is being supervised by my professor, Dr. Katherine Propst.

It is my plan to reproduce the instruments; and if necessary, amend questions according to the purpose of the study. The instruments will be administered and analyzed by me to teachers in an urban environment. In addition to using the instrument, I also ask your permission to reproduce it in my dissertation appendix. The dissertation will be published in the Gardner-Webb University database and deposited in the ProQuest Dissertations & Theses database.

I would like to use and reproduce your instruments under the following conditions:

- I will use the questions only for my research study and will not sell or use them for any other purposes.
- I will include a statement of attribution and copyright on all copies of the instrument. If you have a specific statement of attribution that you would like for me to include, please provide it in your response.
- At your request, I will send a copy of my completed research study to you upon completion of the study and/or provide a hyperlink to the final manuscript.

If you do not control the copyright for these materials, I would appreciate any information you can provide concerning the proper person or organization I should contact. If these are acceptable terms and conditions, please indicate so by replying to me through e-mail at rstanley3@gardner-webb.edu.

Sincerely,

Rochelle D. Stanley

Aaron Slutsky, Ed.D. | Chief Technology Officer | Gaston County Schools

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This message originated from Gaston County Schools. All e-mail correspondence to and from this address is subject to the North Carolina Public Records Law as defined under N.C.G.S. §132.1, which may result in monitoring and disclosure to third parties, including law enforcement and the media.

Appendix D

RIST PD Opportunities

RIST PD Opportunities

2021

- Dr. Bryan Harris-Feedback that Doubles the Speed of Learning
- Dr. Bryan Harris-Writing that Ramps Up Learning and Engagement
- Dr. Bryan Harris-Questioning Strategies that Motivate and Engage
- Dr. Brian Housand-Differentiating for the Head and the Heart

2020

- Creating a Classroom Data Culture Workshop
- 2020 Summer Symposium-Resilient Teaching in a Virtual Classroom with Dr. Linda Hoopes, Founder resiliencealliance.com
- Live Virtual Talk with Natalie Wexler: Virtual Learning Loss and the Knowledge Gap
- September Virtual Workshop Series: Challenging Conversations, Creating Successful Change and Virtual Student Engagement Strategies with Empower Health America, Dr. Linda Hoopes and Dr. Bryan Harris
- October Virtual Series- with Dr. Bryan Harris: Advanced Student Engagement Strategies, Reaching the Reluctant Learner and Working Memory

2017-2019

- 2019-2020 Focus on NC Re-Licensure Digital Learning Requirement including Micro: Bit programming
- 2019 Summer Symposium: Passion, Purpose and Perseverance
- 2018-2019 Focus on Teacher and Student Resilience-Four Work shops
- August Workshop-Strategies from Neuroscience Research
- Annual August Reception
- Design Thinking Workshop
- Summer Symposium Intentional Leadership Workshop   http://www.centerforintentionalleadership.com/
- Raspberry Pi 3 Workshop
- Hornets Tickets
- Arts/Cultural Tickets
- Holiday Luncheon-Resilience Screening
- Technology: FROM CURIOSITY TO CREATIVITY
- Lego Serious Play
- Lower Level Ticket to the Belk Bowl for Alumni and their Familes

2016-2017

- August Workshop- Arts & Physical Activity in Executive Function   Adele Diamond   http://bit.ly/TTFI2016SymposiumPlaylist
- Annual August Reception   http://bit.ly/TFI2016Experience

- Raspberry Pi 3 Workshop   Discovery Place Education
  Studio
- Hornets Tickets
- Arts/Cultural Tickets   Arts & Science Council etc.
- Dinner and discussion

A Journey to Manhood   Kevin Powell   http://www.kevinpowell.net/
The Opposite of Spoiled   Ron Lieber   http://ronlieber.com/
          http://www.jessicalahey.com/

The Gift of Failure   Jessica Lahey
- Holiday Luncheon-Omar Simpson   http://bit.ly/TFIOmarSimpson

Previous Academic Years

- Stanford PERTS   http://bit.ly/TFIMindsetPlaylist
Summer Leadership Workshop http://www.centerforintentionalleadership.com/

- Hornets Tickets
- Arts/Cultural Tickets   Arts & Science Council etc
- Arts & Creativity in Education   http://lilysarahgrace.org/
- Holiday Luncheon-Film Screening Most Likely To Succeed
- Trainings from Pat's Place
- Positive Discipline Classes with Suzanne Smitha
- Local Slow Food Luncheon at 7th Street Market with Lesson Plans
- 3D Printing Class
- Urban Education Class w/ UNC Charlotte http://bit.ly/TFIUrbanEdPlaylist
- Dinner and Talk with Dr. Michael Thompson
- Philosophy 101 with Davidson Center for Ethics
- Workshop on K-12 Furniture/Classroom Design Gantt Huberman Architects

          http://www.mltsfilm.org/

Appendix E

Email to RIST Director

Greetings Fellows,

I hope this school year is going well for you. Recently, Rochelle Stanley, a 2013 TFI Fellow and EdD Candidate in Curriculum & Instruction at Gardner-Webb University sought your support with a research study for her dissertation. She still needs additional TFI participants to ensure it is a valid study. We hope you can support her educational journey.

The purpose of this study is to determine the elements impacting K-12 teachers' technology self-efficacy while implementing distance and hybrid learning during Covid-19. In this mixed methods study, TFI fellows will be given a technology self-efficacy survey. You will be asked about your level of confidence in completing specific technology tasks during Covid-19. Your responses are anonymous. The survey should take you about 5-10 minutes to complete. Additionally, you will be invited to participate in an optional 30-minute focus group via Zoom by the end of this week. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you have completed the survey previously, you do not need to do it again and thank you for your support. The survey link is below:

https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_cHIEcbUjxeWuqgu

Executive Director
Anonymous