2-2-2024

Secondary Special Education Teachers' Perception of Technology Integration and its Use in Classroom Instructions

Carla Mills Windfont
Walden University

Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Carla Mills Windfont

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. John Harrison, Committee Chairperson, Education Faculty
Dr. John Flohr, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

Secondary Special Education Teachers' Perception of Technology Integration and its Use in Classroom Instructions

by

Carla Mills Windfont

EdS, Walden University, 2011

MS, University of Houston – Clear Lake, 2009

BS, University of Houston - Downtown, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

P20 – Self Design

Walden University

February 2024

Abstract

At a mid-size suburban school district located in Texas, secondary special education teachers are not integrating technology routinely into their content-based lessons, thereby not ensuring special education students have access to a guaranteed viable curriculum. The purpose of this basic qualitative research study was to explore secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. Mishra and Koehler's technological pedagogical content knowledge (TPACK) conceptual framework grounded this study. The research questions sought to gain knowledge regarding the factors secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students. Purposeful sampling was used in the participant selection. Data was collected from 15 semistructured interviews video recorded and transcribed. The data was analyzed using Braun and Clarke's six-phase thematic analysis. The results of the analysis revealed key factors that influenced their instructional decisions: tools and practice, professional development, digital shifts, and TPACK. The recommendation for future research is that multiple data sources should be used to triangulate data. This study may positively impact social change by gaining a better understanding of ways to assist secondary special education and general education teachers with technology integration and prepare students using 21st-century skills that will enable them to compete and succeed academically.

Secondary Special Education Teachers' Perception of Technology Integration and its Use in Classroom Instructions

by

Carla Mills Windfont

EdS, Walden University, 2011

MS, University of Houston – Clear Lake, 2009

BS, University of Houston - Downtown, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

P20 – Self Design

Walden University

February 2024

Dedication

This research is dedicated to my Lord and Savior for His grace and mercy throughout this entire process. My loving husband, Alex Windfont, who listened, comforted, and encouraged me all the way. My children, Alexandria, Carlyle, Tramain, Jessica, and Britnee inspired me to continue the process. My grandchildren Rayne, Autumn, and Aria sat at the kitchen table and colored and completed homework while I worked on my dissertation.

Acknowledgments

I would like to thank my chair, Dr. John Harrison, committee person, Dr. John Flohr, and URR, Dr. Josh Goss. Their advisement guided me along the way. For that, I thank God for them. Thank you to the local school district research committee members that approve my research study and my darling mother, Martha Ann Bell, who prayed and supported my educational journey. The weekly Saturday prayer warriors Jim, Charles, Jane, and Martha lifted me before God for my dissertation completion. A host of family members cheered me on. My Texas Alliance of Black School Educators (TABSE) members paved the way and completed their doctoral degree. Billie Briggs and Elizabeth Lalor who provided encouragement to not be all but dissertation (ABD). My best friends, Daniel and Charley Bevill, and other dear friends Dr. Joy Wilson, Dr. Rachel Alex, Dr. Darwin Spiller, Ann Williams, Bashelia Ward, Dr. Ashley Hughley, Shelia Curtis, and Linda Fisher-Griggs who all stood in the gap for me when I was not sure myself. You all are the best.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Instructional platforms have shifted in the last decade, and the blending of technological and pedagogical skills has become an expectation in all educational environments (Paul & Jefferson, 2019). However, educators need an innovative approach to transform traditional and digital learning that will provide flexibility to maneuver between face-to-face and virtual instruction as needed. Adnan et al. (2020) noted that curriculum and innovation occur when teachers are willing to change. High school general education teachers support technology integration for classroom instruction when trained (Lalima & Dangwal, 2017; Marie, 2021); however, special education teachers have indicated that when they are presented with required technology training, there is no focus on specific targeted instruction for the special education population and how to meet the needs of their students (personal communication, August 2021). Additionally, there are many challenges that special education teachers face daily due to the increasing demands of their job duties and responsibilities as classroom teachers. Technology integrations in special education must be accompanied by proper professional development and training (Cárdenas & Inga, 2021).

The gap in practice for this basic qualitative study involved special education teachers' best practices integrating technology routinely into their content-based lessons, thereby ensuring special education students have access to the guaranteed viable curriculum (personal communication, Texas School District 1 (TSD1), August 3, 2021). This study positively impacted social change through gaining a better understanding of

ways to assist secondary teachers with technology integration and prepare students using 21st-century skills that will enable them to compete and succeed academically.

This basic qualitative study focused on technology integration through the lens of TPACK. The local district's technology integration initiative supported the vision and mission of Simon Sinek's golden circle and enforced the importance of teachers knowing their what, how, and why (Kaoun, 2019). According to TSD1's initiative, when technology integration is connected to a highly effective curriculum, all students should have access to varied learning opportunities. Consequently, the school district must assist all teachers in bridging the gap in practice by integrating technology. Thus, it is essential to successfully prepare learners today to explore secondary teachers' perceptions of technology integration, content knowledge, and how it impacts their technology integration decisions. . Falloon (2020) argued that everyone wins when teachers are confident teaching content using technology and students are engaged using technology. This study focused on the development of this professional skill, including professional development for execution.

Background

The site of this basic qualitative study was in a suburban mid-size school district in Texas, which will be referred to using the pseudonym of Texas School District 1 (TSD1). School districts across the United States are researching best practices that teachers can use to strengthen low-performing special education students' educational levels and close the achievement gap (Green et al., 2021). School districts target much of their funds to enhance technology for the general education population; however, special

education students' technology differs from those of the general education program needs (TSD1 Budget, 2021).

Special education students’ failure to meet accountability expectations caused local school districts to inquire about why they are not achieving at the rate of their peers. The achievement gap between African Americans, Hispanics, and White students has increased in the past few years (Emery et al., 2022). Every Student Succeeds Act (ESSA) replaced the No Child Left Behind (NCLB) Act to address public schools' gaps in accountability. According to Jennings (2018), the Federal Register in 2016 reported that ESSA regulations address state academic performance and improve education quality. Local districts across the United States are researching effective practices that teachers can use to strengthen low-performing special education students' educational levels and close the achievement gap.

The site of this basic qualitative study was in a suburban mid-size school district in Texas, which will be referred to using the pseudonym of Texas School District 1 (TSD1). School districts across the United States are researching best practices that teachers can use to strengthen low-performing special education students' educational levels and close the achievement gap (Green et al., 2021). School districts target much of their funds to enhance technology for the general education population; however, special education students' technology differs from those of the general education program needs (TSD1 Budget, 2021).

Special education students’ failure to meet accountability expectations caused local school districts to inquire about why they are not achieving at the rate of their peers.

The achievement gap between African Americans, Hispanics, and White students has increased in the past few years (Emery et al., 2022). Every Student Succeeds Act (ESSA) replaced the No Child Left Behind (NCLB) Act to address public schools' gaps in accountability. According to Jennings (2018), the Federal Register in 2016 reported that ESSA regulations address state academic performance and improve education quality. Local districts across the United States are researching effective practices that teachers can use to strengthen low-performing special education students' educational levels and close the achievement gap.

A challenge for the special education field is technology integration and what it looks like in action, among subject content, IEP goals, accommodations, and modifications in comparison to general education. During a back-to-school special education academy training for the 2021-2022 school year, a discussion occurred in TSDS1 regarding the technology integration initiative and the lack of technological content knowledge regarding special education instruction (personal communication, August 2021).

The local school district rolled out a blended learning vision, mission, and expectations in 2021 (TSD1, personal communication, August 3, 2021). While attending a TSD1 departmental meeting, special education teachers shared concerns about students having both reading and math achievement gaps; however, many special education teachers are unsure how integrating technology may assist students with their foundational deficiencies (personal communication, August 9, 2021). Since 2019, the usage of technology-enhanced instruction at the secondary level has propelled technology

integration as the driving force (Sackstein et al., 2019). There is a gap, however, in the practice of integrating technology in secondary special education classroom instruction.

The gap in practice for this basic qualitative study involved special education teachers integrating technology routinely into their content-based lessons, ensuring special education students have access to the guaranteed viable curriculum. According to Rolf et al. (2019), teachers perceive that learners' digital competencies and the motivation for special education needs, such as expression, sharing, and peer interaction, are limited by technology integration. Rolf et al. further explored the design patterns special education teachers incorporated into their digital learning activities. The research study revealed that technology integration increased when teachers routinely used digital learning activities daily as classroom practices. TSD1 initiated a technology integration initiative because teachers' technology integration had not increased in past years, although secondary students had access to technology using the district's one-to-one digital device program.

Table 1 illustrates the comparative overall district student assessment scores in Math, ELA, Science, and US History versus overall district special education student assessment scores illustrated in Table 2. According to the Texas Education Agency (TEA)(2021), STAAR performance standards tie test performance levels to the goals outlined in the state-mandated curricular standards known as the Texas Essential Knowledge and Skills (TEKS) (Texas Education Agency, 2021). The responsibility of establishing assessment scores to differentiate performance levels rests on the Texas Education Agency. There are three performance categories related to student

performance on the assessment; Masters Grade Level, Meets Grade Level, and Approaches Grade Level.

Table 1

TSD1 Academic Report Special Education 2021 (District Scores)

TSD1 Overall	ELA	Math	Science	US History
At Approaches GL Standard or Above	62%	79%	78%	82%
At Meets GL Standard or Above	45%	52%	46%	56%
At Masters GL Standard or Above	5%	28%	13%	27%

Note: From Texas Education Agency, Accountability Report 2021

Table 2

TSD1 Academic Report Special Education 2021 (District Scores)

TSD1 Overall SPED	ELA	Math	Science	US History
At Approaches GL Standard or Above	28%	50%	49%	55%
At Meets GL Standard or Above	19%	27%	22%	32%
At Masters GL Standard or Above	2%	10%	4%	12%

Note: From Texas Education Agency, Accountability Report 2021

Tables 3 and 4 show the comparative overall TSD1 district scores in Math, ELA, Science, and US History versus overall district special education scores. According to the Texas Education Agency (2022), STAAR performance standards tie test performance levels to the goals outlined in the state-mandated curricular standards known as the Texas Essential Knowledge and Skills (TEKS). The data revealed how secondary special education students perform 30% lower than the overall student population. TSD1 seeks ways to improve special education achievement (TSD1 improvement plan, 2021).

Table 3

TSD1 Academic Report 2022 (District Scores)

TSD1 Overall	ELA	Math	Science	US History

At Approaches GL Standard or Above	64.5%	87.5%	80%	88%
At Meets GL Standard or Above	42%	54%	47.5%	62.5%
At Masters GL Standard or Above	4.5%	29.5%	13.5%	34%

Note: From Texas Education Agency, Accountability Report 2022

Table 4

TSD1 Academic Report Special Education 2022 (District Scores)

TSD1 Overall SPED	ELA	Math	Science	US History
At Approaches GL Standard or Above	38%	65.5%	52%	65.5%
At Meets GL Standard or Above	17%	40.4%	21.5%	38.5%
At Masters GL Standard or Above	3%	19%	3%	16.5%

Note. From Texas Education Agency, Accountability Report 2022

TSD1 used the following digital learning resources across content areas to align with the general education curriculum for all students. Studysync is used for English Language Arts and Reading (Studysync, n.d.). The instructional technology program provides writing support and vocabulary. Common Lit is also used for English Language Arts and Reading and provides literary selections. DeltaMath provides students with mathematical support for higher-level math problem-solving (DeltaMath, n.d.). The program replaces the need for use of a graphing calculator. Additionally, Flocabulary and

Edupuzzle are digital enhancement resources that can be used across content areas to meet the various learning styles of special education students. Think Cerca provides support for students' critical writing skills and is aligned with general education instruction (ThinkCERCA, n.d.). To implement programs with students, TSDS1 provided professional development sessions were provided to give teachers an overview of each software; however, in-depth training for special education teachers specific to each blended learning platform has been limited. As a result of special education teachers not having the necessary training for each instructional technology platform supported by the district, teachers, in turn, lack the content knowledge and skills of how to readily support students in the classroom environment. The goal of this study was to provide recommendations to the local district's technology integration initiative to address the gap in practice for this basic qualitative study as it involves special education teachers integrating technology routinely into their content-based lessons, thereby ensuring special education students have access to the guaranteed viable curriculum.

District personnel presented campus accountability reports to campus administrators and instructional specialists. The presentation revealed that the special education subpopulations' scores were significantly lower than their peers. The results caused TEA to identify the TSD1 special education population as a "Needs Intervention" on the district report card; therefore, the local district explored ways to increase special education students' academic performance (TSD1 State Report Card, 2021). Additionally, data reports were presented to administrators and campus specialists. TSD1's special education Curriculum and Instruction department initiated a prescriptive special

education Campus Instructional Support Plan (CISP) (personal communication, September 2020).

Campus meetings provided campus specialists an opportunity to share a prescriptive analysis and approach for special education instructional support to meet the campus needs. Each campus was given the charge to document support and student progress toward their weekly goals. Moreover, the special education CISP also included the individual campus data from TEA for the designated student population and demographics. The special education senior director, campus administrators, and special education instructional specialists collaborated to prescribe a special education instructional support plan for the school year (TSD1, SPED C & I Team, 2022).

Problem Statement

The problem addressed in this basic qualitative study was secondary special education teachers' descriptions of technology integration regarding their subject-content expertise and the factors that affect their technology integration decisions. Schools strive to bridge the gap between teachers' and students' grasp of today's rapidly growing educational technologies. Moreover, secondary teachers' opinions of technology integration vary with regard to the implementation of technology and influence the success of the integration process (Akram et al., 2022). Change is most often seen as difficult for some teachers; therefore, their professional development needs will vary, especially in special education (Darling-Hammond et al., 2019).

Although most science and math teachers recognize that technology integration improves student accomplishment, many do not use it extensively in their instruction for

academic achievement (Firat, 2020). By concentrating on the teachers' perspective, as well as, their individual technology self-efficacy level, research may be conducted to establish a stronger foundation, allowing teachers, schools, and school districts to better comprehend, integrate, and employ technology for student benefit (Durff & Carter, 2019).

This basic qualitative study sought to address and better understand teachers' perceptions of technology integration in secondary special education classroom instruction. It is important to explore the perceptions of secondary special education teachers and their willingness to routinely integrate technology within their content-specific lessons. Building capacity in technology integration routinely to support special education students is a critical component for teachers (Kondos, 2018). It is imperative for learning organizations to provide specialized professional learning opportunities for teachers to ensure technology integration is geared toward students' improved learning experiences (Lam et al., 2021).

Kondos (2018) concluded that the teachers' role as educators has changed since the new technology era. Furthermore, Kondos's study explored English as a Second Language (ESL) teachers views regarding adding innovative technology in the classrooms. Results indicated two prominent factors affecting technology integration: (a) ESL teachers resisted changing their roles in the classroom; and (b) ESL teachers' reluctance to include technology in their classroom consistently. The examination of TSD1's Academic Performance Report (2021and 2022) data revealed that secondary special education students in core subject areas of English I, II, Algebra I, Biology, and

US History were performing significantly lower than other subpopulations groups. Due to students' academic performance, there was a need for TSD1 to discover factors that may influence secondary special education academic performance.

Educational systems have found the need to discover new technology integration designs to reach the goal of quality education for all (Akram et al., 2022). Akram's study explored how information and communication technology (ICT) has incorporated interactive and engaging instructional practices to enhance the quality of teaching and learning. The local school district has purchased digital learning programs, and professional development regarding comprehensive technology training has been provided to all teachers. Findings revealed that teachers' self-efficacy affects students' technology usage and outcomes. According to Regan et al. (2019), classroom technology integration has become a global goal.

Purpose of the Study

The purpose of this research study was to explore secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. Information communication technology (ICT) tools have increased in classrooms and teachers have difficulties integrating the tools in lessons to enhance the teaching and learning experience (Khine et al., 2019). According to Lyublinskaya and Kaplon-Schilis (2022), ICT has increased the need for teaching with varied technology approaches and virtual learning environments. Kondos's (2018) emphasized how the role of a teacher has changed from teacher-led instruction to student-centered instruction. Therefore, the

learners are given tools to facilitate their learning with the acquired knowledge of technology (Kondos, 2018).

This study explored instructional strategies school districts used to improve and sustain secondary special education students' achievement through educational technology. Secondary special education teachers have received limited training to address the differentiation of digital instruction for the special education student population with a blended learning model (TSD1 District Improvement Plan, 2021). The dissertation provided recommendations for the use of TPACK to improve teachers' delivery of content for special education students.

Research Questions

The research questions below guided this basic qualitative study:

RQ1. What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?

RQ2. How do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?

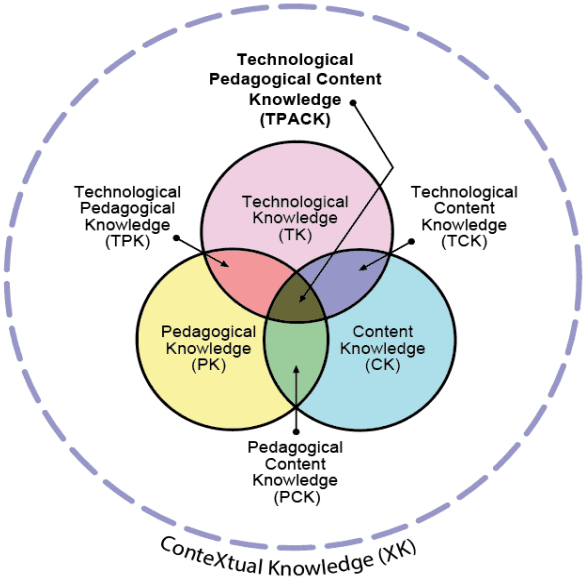
Conceptual Framework

The TPACK framework was used to ground this basic qualitative study. TPACK was appropriate as a framework based on the components of the framework that addressed the complexity of technology integration, students and teachers learning through technology, and content. TPACK emerged from Shulman's (1986) research on

pedagogical, content, and knowledge (PCK), which outlines how to teach subject-specific content. On the basis of this, PCK, Mishra and Koehler (2006) created the TPACK framework, which incorporates the interaction between content knowledge (CK), pedagogical knowledge (PK), and technology knowledge (TK). CK referred to a teacher's knowledge and understanding of the subject matter. PK involved the knowledge and consideration of educators regarding techniques, strategies, and teaching and learning processes to generate optimal and effective learning environments. PK was the educators' knowledge and consideration of methods, tactics, and teaching and learning processes to produce effective and successful learning environments, which also bridged the digital divide between teachers and students. TK related to the capability of educators to employ digital technology in the profession of teaching and learning and successfully create a 21st century learning environment (Utama et al., 2019).

Figure 1

TPACK Framework



Note. Revised version of the TPACK image. © Punya Mishra, 2018. Reproduced with permission.

Mishra and Koehler (2006) emphasized that technology integration in any classroom was directly correlated to the teachers' ability to maneuver through all facets of TPACK components. Mishra (2019) described the types of knowledge teachers require to successfully integrate technology in the classroom. The concept that supported this basic qualitative study was the conceptual framework of Mishra and Koehler's (2006) TPACK framework (Figure 1), which best described the relationship between PCK, TCK, and TPK instructional strategies that demonstrate an ability to improve pedagogy (Mishra, 2018).

The TPACK framework grounded this dissertation because it combined the multifaceted constructs of teaching: technology pedagogical knowledge (TPK), technology knowledge (TK), technology content knowledge (TCK), and pedagogical content knowledge (PCK) coupled with the skills and strategies needed to teach diverse special education populations in the secondary school setting.

Nature of the Study

The nature of this basic qualitative design was to understand how secondary special education teachers describe their preparation regarding the integration of technology in their classroom instruction for grade-level specific content areas. According to Merriam and Grenier (2019), basic qualitative methods involve individuals and contextualized experiences. Qualitative research also provided an avenue for researchers to explore, investigate, and seek a better understanding from a participant's perspective (Huyler & McGill, 2019). This study focused on the gaps in practice for this basic qualitative study involved special education teachers integrating technology routinely into their content-based lessons.

The basic qualitative design used in this study helped lead to an understanding of how special education teachers implement integrated technology and their perceptions of its implementation in secondary classrooms in a school district in Texas. The participants in the study included secondary special education teachers from both middle and high schools. Participants for the study included 15 secondary special education teachers, and semistructured interviews used to explore their perceptions of technology integration and its implementation in the classroom. A basic qualitative study approach allowed this

study to explore how secondary special education teachers perceive integrating technology in the teaching and learning environment based on their own experience (Rolf et al., 2019).

Definitions

Blended learning: Blended learning is any instruction in which a student is in a supervised school environment and receives all or part of his curriculum via an online resource is considered blended learning (Schnieder et al., 2022).

Content knowledge: Content knowledge is the knowledge of specific content subjects only but lacks the skill of teaching the content to students (Singh, 2022).

Digital learning programs: Digital learning programs are the digital skills incorporated into digital educational competencies for digital demands (Karunanayaka & Weerakoon, 2020).

Digital learning readiness: Digital learning readiness is understanding teachers' readiness to manage digital learning (Liza & Andriyanti, 2020).

Every Student Succeeds Act (ESSA): ESSA is the legislative act passed in 2005 that gave provision for professional development that empowers educators to implement technology-based personalized learning (Yang et al., 2021a).

Individual Education Plan (IEP): IEP is an individual education plan designed for a special education student and prepared by a certified special education educator who considers the individual's needs to meet their academic needs (Kozikoğlu & Albayrak, 2022).

Individuals with Disabilities Education Act (IDEA): IDEA is a law initiated in 1975 that mandated local educational programs to provide students access and services for students' access to devices and technology as part of the individual education program (Álvarez, 2021).

Pedagogical Content Knowledge (PCK): PCK is the combination of pedagogy and specific subject discipline knowledge used for teaching (Gao et al., 2021).

Special education: Special education is the education of specifically dedicated individuals with disabilities, including diverse learners at risk, in a resource or collaborative teaching classroom (Francisco et al., 2020).

Technological Content Knowledge (TCK): TCK is the combination of specific content knowledge and technological knowledge through technology integration (Dikmen & Demirer, 2022).

Technological Pedagogical Content Knowledge (TPACK): TPACK is the educational awareness of instructional strategies, approaches, and methods via technology to improve or enhance students' learning (Andyani et al., 2020).

Assumptions

Research assumptions for the research study are any ideas, or issuances on the subject matter that the researcher takes for granted (Theofanidis & Fountouki, 2018). An assumption in this dissertation was that secondary special education teachers understand their roles and responsibilities as special education teachers. It was assumed that the TSD1 technology integration initiative required all teachers to integrate technology into their classroom instruction. A third assumption was that secondary special education

teachers attend all their core content professional development training, as required by TSD1. Finally, it was also assumed that once participants read and sign their informed consent form, they agreed to participate with the greatest fidelity and honesty.

Scope and Delimitations

The setting for the study was in secondary schools in a mid-size school district in Texas. Secondary special education teachers have access to several digital tools and program electronic learning management systems that support technology integration. However, secondary special education teachers are not consistently integrating technology because of limited technological pedagogical training and the lack of willingness of the teachers to use ICT in the classroom (Singhavi & Basargekar, 2019). According to TSD1's technology integration initiative (2021), all teachers must implement blended learning in their classroom instruction. This topic was chosen to understand better why secondary special education teachers are not implementing technology integration consistently. The participants included in this basic qualitative study are secondary special education teachers in core content courses such as English language arts and reading, mathematics, science, and social studies or U.S. history who have been teaching in the TSD1 district since the technology integration 2021 was initiated. Since the setting for the study is a mid-size school district in Texas, findings may not be transferable to a smaller school district or a large urban school district outside of Texas. Readers have the discretion to determine what findings will apply to the study. Therefore, some individuals may have the opportunity to use these findings if they find relatable data in their specific setting.

The delimitations of a study are the boundaries the researcher establishes, with purposeful exclusionary and inclusionary judgments made during the study's creation. Delimitations, as defined by Hancock et al. (2021), are the limitations of the research that are determined during the stages of development. Dumitrica and Jarmula (2022) remarked that the limitations are dependent on the investigated issue and a general description of the detected components. According to Creswell (2013), delimitations are the factors that specify the study's parameters. The researcher has authority over the delimitation guidelines. The small sample size of 15 participants also limited the capacity to evaluate if the theme has reached saturation, although it is likely that it was achieved.

Limitations

Research limitations were issues and occurrences that develop during the investigation beyond the researcher's control (Ross & Bibler Zaidi, 2019). One of the limitations of this study was that the views and experiences of the participants interviewed may or may not have reflected the beliefs and experiences of special education teachers with comparable characteristics. Another limitation of the study was that the findings that may be limited to the behaviors, beliefs, experiences, and activities of the individuals, group, and organization presented in this study (Dumitrica & Jarmula, 2022). Dumitrica and Jarmula's qualitative research analyzed students' reflections on how they learn to learn digital learning objects (DLO). Findings allowed DLO to address teaching and learning interventions.

In this dissertation, another limitation considered was on how to measure the effectiveness of technology integration and implementation. This limitation could have

been uncontrollable. Therefore, data collection was limited to the number of participants' responses during interviews. Therefore, the results from the sample size could be generalized to a larger population in the education field. Furthermore, the perception, teaching, and learning experiences may not be generalized to the education and teaching environment. Consequently, similar findings may or may not be found in additional investigations.

Since the setting for the research study was a mid-size school district in Texas, findings may not be transferable to a smaller school district or a large urban school district outside of Texas. Readers have the discretion to determine what findings will apply to the study. Therefore, some individuals will have the opportunity to use these findings if they find relatable data in their specific setting.

Significance

The significance of the basic qualitative study was to provide TSD1's decision-making leaders with a better understanding of the feedback obtained on how secondary special education teachers perceive technology integration and its use in classroom instruction. Few studies explore technology integration and special education within schools and districts. However, the use of technology in the classroom has become of paramount importance nationally (Martin, 2021).

This dissertation was significant because it provided special education teachers, global leaders, and school leaders with a greater understanding and knowledge base of improving technological integration for this student population. The study allowed district leaders and educators to understand how to leverage content knowledge and

technology-based practices to influence the instructional setting for special education students. Recommendations were presented on improving secondary special education teachers' perception while enhancing teacher technology integration and technology content confidence. This dissertation has the potential to inform the work of secondary special education educators, thereby promoting positive social change in the professional learning community.

Summary

The purpose of this basic qualitative study was to investigate secondary teachers' descriptions of technology integration in relation to their subject-matter expertise and how this affects their technology integration decisions. Since ESSA's formation, provisions were allocated for technology integration on behalf of the special education department. The literature described in Chapter 1 defined secondary special education teachers' perception of technology integration and its use in classroom instruction. In addition, the definition of the constructs of teacher pedagogical knowledge, content knowledge, and technology knowledge according to the TPACK framework (Bouchard, 2019; Koehler & Mishra, 2009; Mishra & Koehler, 2006; Tseng et al., 2019). Research conducted related to special education teacher perception, and TPACK found a positive influence on teacher beliefs. However, the opportunity for misplaced technological knowledge is as if the teacher has a limited understanding of the content. As a result, special education teachers may not be encouraged enough to integrate technology because they focus on content delivery of instruction in the classroom (M. Alizadehjamal et al., 2020).

The conceptual framework constructs supported secondary special education teachers technology integration and scaffolding of professional development in digital learning, blended learning, and balancing of the educational demands as a special education teacher (Hill & Uribe-Florez, 2020; Young, 2018). Evidence revealed that teacher preparation programs at institutions in the United States and internationally vary in special education teacher qualifications and certifications (Young, 2018). However, special education teachers across the nation expect to meet specific roles and responsibilities of the job description.

In Chapter 2 of this study, a review of research literature is provided, included the conceptual framework, a review of literature related to key concepts and variables, teacher knowledge, technology integration, special education teachers' roles and responsibilities, and teacher willingness. The literature review provides supportive constructs of technology integration that has transformed technological and pedagogical instructional methods for secondary special education teachers. The conceptual framework of TPACK is provided through researchers' and educators' views of technology integration as it relates to secondary special education-specific subject content and pedagogy.

Chapter 2: Literature Review

The problem of this basic qualitative study addressed secondary special education teachers' descriptions of technology integration in relation to their subject-content expertise and how this affected their technology integration decisions. This topic discussed in the context of secondary special education teachers' roles and obligations to incorporate IEP goals, develop accommodations, and change instructional methodologies. There was a need to improve secondary special education academic achievement by exploring technology integration through the special education lens. The basic qualitative study highlighted technology integration and special education teachers not integrating technology routinely into their lessons, thereby ensuring special education students and teachers have access to the training and strategies needed to achieve student success.

The basic qualitative study explored the gap in practice that would improve secondary special education teachers' technological and pedagogical approaches focusing on TPACK and its use to improve special education academic performance in the classroom. The dissertation was framed by the conceptual framework of TPACK.

Learning to teach is difficult and time-consuming; however, professional development is essential as a teacher. With the paradigm shift in education, both the teacher's and the students' roles have changed (Ugur et al., 2022). Student mastery through demonstration has become the new expectation, which places teachers in the role of a coach. Content delivery has changed over time. The expectation in education is to use technology with content and lessons. This new way of preparing learners is causing

teachers major challenges. For example, some teachers reported insufficient resources, time, training opportunities, financing, and lack of support as barriers (Andrade-Vargas et al., 2021). Thus, many schools are using TPACK to respond to their teachers' ICT needs and provide support.

The review of the literature explores the TPACK framework as it provided the conceptual framework for this study. The literature pertinent to the study is also exhaustively explored. The relationship between technology integration and content knowledge from the perspective of technology integration decisions and teachers' perceptions of the process of technological instructional resources is the major topic discussed in this review of the literature.

Literature Search Strategy

Many searches were performed in databases such as SAGE, ProQuest, EBSCO, and ERIC to discover peer-reviewed articles published during the years from 2018 to 2023. These databases used were scholarly and seminal articles on special education, special education teachers, technology integration, technology integration in special education, TPACK, and technology integration barriers. The search terms included *technology integration, special education teachers, technology integration barriers, best practices, teacher perceptions, attitudes, pedagogy, TPACK model, SAMR, RAT,* and *PICRAT*. The terms *special education and technology integration* using *TPACK* as a framework were also thoroughly searched.

Conceptual Framework

The TPACK framework by Mishra and Koehler (2006) guided this study to explore teachers' perceptions of technology integration. This framework was the appropriate approach because the framework focused on teachers' understanding of how to use technology to facilitate learning in certain subject areas by employing proper pedagogical strategies. Literature demonstrated that the majority of educators have a high degree of subject-matter, pedagogical, and ICT-specific knowledge and skills (Wang et al., 2004; Wang et al., 2018). However, they are unable to effectively integrate digital technologies into their classrooms due mostly to a lack of ICT skills and knowledge of appropriate pedagogical strategies. Teachers struggle to effectively integrate these types of knowledge into a meaningful framework that would enable them to design their own interventions by taking into account curriculum requirements and students' learning needs (Jimoyiannis, 2010; Liao et al., 2021). There is evidence that TPACK provides a method for integrating pedagogy and technology to address the demands of schools in the 21st century (Valtonen et al., 2017; Yeh et al., 2021).

The concept of TPACK was originally based on the concept of PCK, which was proposed by Shulman (1986) and referred to specialized professional knowledge that includes two types of knowledge: content knowledge and pedagogical content knowledge. These include (a) general pedagogical principles and skills, and (b) the knowledge of the subject domain (Shulman, 1986). Shulman made a groundbreaking contribution that effectively addressed two essential goals of teachers' pedagogical thinking. First, he described the understanding on how to teach a specific topic; and,

secondly, and he shared practices on how educators integrate technology into their instructional practices. Teachers' knowledge and skills and abilities regarding technology have become a priority. In this light, Mishra and Koehler's (2006) framework of TPACK has gained prominence and has become useful in educational research and teacher development. As a result, the basic premise proposed by TPACK is that ICT should not be viewed as a standalone concept that may be added to existing teaching approaches nor taught in isolation (Falloon, 2020).

The TPACK framework by Mishra and Koehler (2006) addressed the multi-facet parts of knowledge embodied in technology in combination with Shulman's theory. Shulman's theory (1986) initiated the PCK phenomenon regarding teacher knowledge and the connection between teaching and learning to content-specific academic achievement. According to Shulman's theory (1986), the teaching and learning profession required teachers to have knowledge of various content areas (Bouchard, 2021). PCK enabled teachers to gain a better understanding of the process of teaching specific subject content and also an understanding of the art of teaching and learning (Evens et al., 2018). Evens et al. (2018) suggested PK and CK must be combined with PCK for teacher professional knowledge to be developed. This study explored two key areas of teacher education: knowledge domains and teacher education curricula offered at institutions.

The study also found that by controlling the pre-test PK test performance, a significant and large effect was found on PK. When controlling the CK post-test scores, a significant with a medium to large effect size was found. However, after controlling the

PCK pretest scores, no significant differences in the post-test for PCK were found. As a result, there were no significant differences between the integration of PK, CK, and PCK in developed learning environments. This was important to this research study because Evens et al. (2018) supported Shulman's Theory (1986) which focused on constructs of PCK to transform teacher knowledge rather than PK and CK.

Mishra and Koehler (2006) focused on how to scaffold the process of PCK. Mishra and Koehler's study supports the premise that instructional strategies for specific content alone were not sufficient alone (Bouchard, 2019). According to Bouchard's study, several elements of knowledge informed the teacher. The key elements were knowledge of the subject area, knowledge of the learner and self, knowledge of general pedagogy, and knowledge of curricula and context (Bouchard, 2018).

Niess (2005) expanded PCK to include integrating technology when teaching specific content. Later known as TCK, Tseng et al. (2019) explored TCK, PCK, and TPK knowledge constructs (Mishra & Koehler, 2006; Shulman, 1986). TCK included the teachers' technology knowledge related to a specific content area. PCK framework combines both CK and PK and is considered an effective instructional practice. Technology used in TPK helps to transform digital learning. TPACK propelled the combined constructs by intentionally and purposefully integrating technology in an appropriate teaching and learning approach. TPACK, as designed by Mishra and Koehler (2006), was created to foster technology integration and to provide research development to further teacher knowledge. The TPACK framework has helped teachers gain a better understanding of effective technology integration in the classroom.

Several factors can play a role in the outcome of TPACK integration. Teachers' views and perceptions of TPACK competencies are regarded as key indicators of their intention to integrate ICT into their instruction by engaging their students in learning activities (Joo et al., 2018; Keol Lim et al., 2019; Scherer et al., 2018). Teachers are more likely to take risks and try new tools when they feel confident and knowledgeable. Liu et al. (2022) discovered that teachers with less teaching experience had greater TK than those with more expertise. In contrast, teachers with over 20 years of experience had higher PK, CK, and PCK scores than those with less experience. Existing study findings also indicated that teachers with greater teaching experience perceived less self-efficacy in their total TPACK regarding a variety of subjects. Studies found teachers with greater teaching experience perceived less self-efficacy in their total TPACK with regard to a variety of subjects (Yeh et al., 2021). These factors have become barriers to effective technology integration.

Studies have found a positive relationship between TPACK-focused professional development programs and teachers' ability to create and implement ICT-based lessons in the classroom (Xie, S. & Li; H., 2018). In fact, a study with primary and secondary teachers in the U.S. conducted by Xie et al. (2021) found the only predictor that can significantly predict TPACK is teachers' value beliefs, i.e. beliefs regarding the necessity and utility of incorporating ICT into their classes. The influence teachers' perceptions have on the learning environment is influential; therefore, professional developments that address their misconceptions and concerns must be addressed thoroughly.

Literature Review Related to Key Concepts and Variable

This study investigated secondary special education teachers' descriptions of technology integration in relation to their subject-content expertise and how this affected their technology integration decisions. A review of literature relative to secondary special education teachers' technology integration, special education teachers' role and technology preconceptions of knowledge and skills needed to serve their students in secondary classrooms has proven vital to this study. TPACK framework, teacher willingness, technology integration, and professional development opportunities provided the special education field with the targeted technology tools for training. This review of literature focuses on: (a) shifts and changes in education; (b) digital shifts in education; (c) technology integration; (d) teacher preconceptions; (e) teacher willingness; (f) secondary special education challenges; (g) technology in special education; and professional learning communities; and conclusion.

Shifts and Changes in Education

Education is ever-changing, which poses continuously evolving and challenging obstacles to teaching and learning. The United States seeks to provide a high-quality education for all students through accountability, effective instruction, and constant improvements reflective of the changes in society (Cohen et al., 2018). The NCLB (2002) Act mandated states to create comprehensive, rigorous, and cohesive curricula but gave states latitude to modify expectations, tests, and educational plans for students. As a result, competency-based learning became widespread. Competency-based learning models are rooted in a standardized curriculum that is to be implemented within a

specific time frame, followed by the assessment of students in a quest to determine their level of mastery as demonstrated by their performance on standardized assessments (Andrade-Vargas et al., 2021).

As a result of this, there has been a surge in the interest in 21st century schooling in recent years and how it varies from previous learning concepts. In our current world, a formed debate about what information is most valuable has been summarized in the broadest sense of 21st century learning (Mishra & Mehta, 2017). While there is much to be said about 21st century learning, the composition of 21st-century schools cannot exist without incorporating 21st century skills. These 21st century skills reflect a new concept that has appeared in recent decades in the debate about educational goals, a family of skills deemed necessary in contemporary cultures. These skills are typically listed as the following: innovation, collaboration/teamwork, communication, social skills, cross-cultural abilities, information and communications technology (ICT) awareness, political awareness, media competency, critical thinking, and learning for the purpose or with the intent of problem-solving (Singhavi & Basargekar, 2019). Additionally, emerging technology, such as the internet and its accessibility, has expanded the possibilities for teaching and learning significantly and ultimately is a transformative resource.

With the technological advancements of today's times, it can be concluded that knowledge is obsolete due to prominent accessibility and immediate access to information which differs from times past. Such viewpoints are supported by the argument that today's students are born using technology and are radically unique compared to previous generations of students, which is greatly attributed to their

exposure to technology and platforms such as, Google Sites applications, gaming websites, and Google G Suites (West & Malatji, 2021).

Given the access of information so readily available to students, 21st century schools do not focus on the knowledge as much as they do on the skills needed to grow from the knowledge gained through what is known as the 4Cs of 21st century schools: critical thinking, collaboration, creativity, and communication (Stauffer, n.d.). Creativity coupled with the ability to learn is constantly being identified as the defining characteristic of students equipped for the more robust life and job conditions of the twenty-first century than those who are less equipped with those skills.

The Digital Shifts in Education

Learners in the twenty-first century have had an abundance of knowledge and interactive technologies, which enables them to create, distribute, and receive information in a variety of ways on a global scale (van Laar, E. et al., 2020). Social networking software, such as Prezi and Blogster, as well as, social media platforms Facebook, Instagram, and Twitter, are all means of technology through which learners can produce and network, thus allowing learners to communicate authentically and with a purpose (Galvin & Greenhow, 2019). Twenty-first century literacy skills illustrate how learners collaborate socially and appropriately, as well as the collaborative learning tools they use. Authentic learning environments are those that replicate the tools used in real-world situations. As a result, it is imperative that 21st century learning consists of the utilization of innovative technology tools and multimodal merging content and technology.

Digital Immigrant and Digital Natives

Students who grew up with technology all their lives are more comfortable using it than their teachers who do not have extensive technology experience. Massey et al. (2022) mentioned that issues arise when students want to use technology tools for assignments that are unfamiliar to teachers. This group of teachers is commonly referred to as digital immigrants (Cherewka, 2020). Moreover, digital immigrants are also described as people who grow up without convenient access to technology (Cherewka, 2020). Digital natives born in the digital age usually enter the classrooms equipped with a wide range of skills that many digital immigrants lack.

Eiland and Todd (2019) suggested that educators take ideas of innovations and behaviors of our students living in the 21st century. Eiland and Todd's research supported using technology to assist with active learning and classroom engagement. The review of literature discussed the barriers to technology integration. The primary barrier of time for the teacher and student to learn the system effectively required teachers to leave their pre-digital practices and comfort zones. Teachers needed to habitually put student participation before using technology to target content. Vaportzis et al. (2017) indicated that the gap between older and younger technology users provided difficulties for some children and teachers must be careful not to classify all students as computer-savvy simply because they grew up during the era of personal computers. The qualitative study participants' ages ranged from 65-76 years old. According to the review of literature, the focus groups explored the participants' attitudes towards using tablets and other technology devices. Results indicated the themes that emerged were barriers such as lack

of knowledge and confidence, lack of instruction and guidance, and feeling inadequate in comparison to the younger generation.

According to the findings of researchers, there are various ways to consider establishing whether an individual is a digital immigrant or a digital native (Janschitz & Penker, 2022). Janschitz and Penker (2022) examined the digital competencies of students in higher education. The review of literature revealed internet use, education level, and experience all have a substantial impact in determining whether a person is an immigrant or a native. The information will help teachers gauge the level of support needed as a digital immigrant and to the learners.

Technology Integration

The impact of the COVID-19 pandemic caused education to pivot at a rapid pace and the changes are still taking place inside the educational system on a global level. To face the challenges of changes and to fulfill the needs of children, schools have adopted new technology and exploring new avenues in an effort to provide all students with access to high-quality education (Stetter, 2018). Thus, technology programs, learning models, and integrations have become a priority for district and education leaders. Durff and Carter (2019), however, noted that technology integrations are not a “one-size” fits all, and programs and models must be assessed carefully. The review of literature showed technology integration is influenced by teachers’ self-efficacy, cultural environment, and social context.

In order to teach technology integration, educators must contend with (a) continually shifting, politically influenced professional requirements, (b) continuously

evolving educational technology resources, and (c) diverse needs across content disciplines and contexts (Kimmons et al., 2020). Technology has continued to evolve; therefore, professional development will be essential to student success and achievement. Many teachers have employed technology integration approaches in a disorganized manner (Kimmons & Johnstun, 2019). However, with a better understanding of the relationship within each model and the role it plays in their lessons and curriculum, teachers will feel more confident integrating ICT and use the tools more effectively (Kimmons et al., 2020).

Education leaders now must restructure the classrooms and reconsider where technology and what technology aligns with curriculum standards. Technology's emergence has grown blended learning environments and communities in school districts nationwide. Blended learning is a technological idea that combines the best parts of traditional classroom teaching and ICT-supported learning, such as offline and online learning (Yang et al., 2021). This model has become the idea of setting up a learning process that includes both face-to-face teaching and teaching with the help of technology. Blended learning incorporates direct instruction, indirect instruction, collaborative teaching, individualized computer assisted learning. This model has an integrated combination of the traditional teaching model and technology. In the blended model learners engage in:

a. face-to-face teaching and online instruction
b. student interaction with curriculum materials
c. peer group interaction (online and face-to-face)

d. ground discussion and exchange of ideas
e. accessing e-library
f. virtual and traditional classroom (Kimmons et al., 2020).

There are several benefits for students learning in a blended learning environment. Students have more time in the classroom portion of the learning that is conducted through ICT, either online or offline, teachers and students also engage in creative and collaborative activities (Kim, 2020). Students benefit from online learning that is combined with the social engagement and the traditional learning experience (Hong et al., 2021). However, implementing a blended learning model requires that teachers be well-versed in the principles of blended learning and acquire the skills necessary to combine both traditional and technological approaches. Teachers should be trained to create digital material while connecting the content with the curriculum (Michela, 2019). The model can be an effective model for education if executed in a well-planned, coordinated manner with the proper attitudes.

Replacement, Amplification, and Transformation & Substitution, Amplification, Modification, and Redefinition (SAMR)

Various technology models have been used to create a 21st Century learning environment, create global thinkers and learners, and develop teachers. For example, the Replacement, Amplification, Transformation (RAT) Model created by Hughes et al. (2006) has been defined as a technology integration concept that views technology as either replacing or supplementing traditional educational methods to enhance learning and transform education in ways that would be impossible without technology

(Kimmons, 2020). The components of this model are categorized into competencies such as replacement, amplification, and transformation. Additionally, to integrate the RAT Model successfully, teachers must have the foundational skills to build upon prior to the technology integration (Hughes et al., 2006; Kimmons, 2020).

Puentedura's (2006) SAMR Model was founded on the RAT Model. The SAMR paradigm consists of four levels of technological integration. The Substitution, Augmentation, Modification, and Redefinition (SAMR) Model was defined as a technology integration system that applies four classifications of technology learning:

- Substitution - The technology functions as a direct tool replacement with no functional modification.
- Augmentation - The technology serves as a direct substitute for a tool with functional improvements.
- Modification - The technology allows for significant task redesign.
- Redefinition - Technology enables the creation of previously unimaginable tasks (Puentedura, 2006).

SAMR highlighted a way of technology integration that follows a linear progression from substitution, where the teacher replaces a non-digital activity with a digital one through redefinition, and tasks are devised that cannot be completed without the use of technology. The lowest level of the SAMR model (Puentedura, 2006), substitution, referred to the incorporation of digital tools without a modification in the lesson's functionality. The second level of the SAMR model (Puentedura, 2006), augmentation, continues to use digital tools rather than conventional ones. At the second

level, the digital tool's functional options were improved. For example, using digital tools at this level could be group projects and student media projects with presentations.

At the third level of the SAMR paradigm (Puentedura, 2006), modification and technology integration became transformative and required a lesson redesign centered on the digital tool. This modification level of the digital tool provides students with access to environments beyond the classroom. For example, students might be assigned an online collaboration assignment that requires them to read online articles and respond to their peers.

The third stage of the SAMR model (Puentedura, 2006), redefinition, involved educating with technology in a manner that would be impossible with conventional methods. For example, students may take a virtual field trip using online virtual field platforms and collaborate in small online groups. These transformative properties created by Puentedura (2006) were developed using the cognitive domain of Bloom's Taxonomy 2.0 learning framework (Krathwohl, 2002; Puentedura, 2014).

Passive, Interactive, Creative, Replacement, Amplification, and Transformation

Although the mentioned models are effective in providing educators with a fundamental understanding of the technology integration procedure, the PICRAT offered a more comprehensive model. Kimmons (2020) PICRAT, more extensive than SAMR models, included students' relationship to technology. PICRAT illustrated the need for teachers to consider two fundamental questions before implementing any technology in their classrooms. The foundational questions examined included a) the students'

relationship to technology and b) how teachers' use of technology is influencing traditional teachers' practices.

Effective technology integrations must include key components such as what, why, and how the tool connects with the overall goal. Many educators have used technology integration approaches in a disorganized manner (Kimmons & Johnstun, 2019). Teachers have typically used technology that they have learned on their own without justification, comparison or strategic use or rationale (Kimmons et al., 2020). For example, PIC refers to three options associated with questions centered on passive, interactive, and creative; and RAT represents the three options for replacement, amplification, and transformation.

`Students have three roles in the PICRAT technology model to ensure academic success. These three roles include passive learning (receiving content passively), interactive learning (interacting with content and/or other learners), and creative learning constructing knowledge via the construction of artifacts (Papert & Harel, 1991). In the past, students have learned as observers and passively using technology (Cuban, 1986). For example, Kimmons et al. (2020) suggested assignments, such as converting lecture notes to PowerPoint slides or displaying YouTube videos, using technology for instruction in which students observe or listen rather than engage as active participants. Teachers began using technology to supplement education operate at a passive level; their students must be specifically guided to progress to greater levels of learning (Vedechkina & Borgonovi, 2021).

Obstacles to Technology Integration

Teachers' familiarity with technology has been found to have a significant impact on how successful technology is integrated into the classroom. West and Malatji (2021) recommended that teachers gradually start with tools that can be used in their teaching profession before starting with the technology used in their lessons. For example, to become acquainted with cloud computing and file management, researchers suggested teachers who are hesitant to use technology start using DropBox, an online document storing and sharing tool. Anderson and Rainie (2021) argued that once teachers recognize the benefits of technology in their own lives, they will be more likely to incorporate similar technologies into their curricula, and their technological efficacy will improve.

Teachers have encountered many barriers during technology integration. There are internal barriers, such as a lack of skills, and there are external barriers beyond their control, such as access to resources. Some confronted obstacles by teachers are more difficult to overcome, such as a lack of functional classroom equipment, sporadic or insufficient professional development, and high prices of network infrastructures and computer equipment (Hennessy et al., 2022) . Moreover, an additional difficulty may be establishing a vision for how technology could be used in the classroom.

Changing a teacher's attitudes about the effectiveness of using technology, a lack of time to prepare and/or practice utilizing technology, and a lack of professional development available to teachers especially are barriers to implementing technology in the classroom (Bowman et al., 2020). Winter et al. (2021) conducted a study and found that teachers' usage of technology is primarily influenced by three variables. These

factors include the experience of other teachers, the availability of technology in the classroom, and in-school training. However, Durff and Carter (2019) suggested obstacles can be addressed through quality professional development. Professional development, particularly mentorship or in-class professional development, was identified as an effective strategy to assist teachers in integrating technology, according to the findings of researchers (Yurtseven Avci et al., 2020).

In-class support and mentorship, as a follow-up, was a missing component in the integration progress. The cost of maintaining mentoring and in-class technology support is not cost-effective for most schools, which has created a barrier (Kuykendall, 2022). Many school districts do not have campus specific technology specialists; however, campuses share technology specialists throughout the district with little receiving one-on-one support. Additionally, few mentors and specialists have participated in the discussion of the impact of teachers' attitudes on the success or failure of technology integration when teachers receive individual support (Top et al., 2021). Fernandez-Batanero et al. (2021) found teachers' attitudes and beliefs about technology, as well as their current levels of knowledge and skills, were the most significant obstacles preventing other teachers from using technology. Cabero-Almenara et al. (2020) also suggested modifying professional development practices to highlight systems that support changes in teachers' attitudes and beliefs.

Teacher Willingness

Teachers’ willingness to integrate technology in their lessons and classes is largely determined by their attitude, access to resources, and the professional

development (Gomez et al., 2021). Special education teachers are required to demonstrate competency in integrating technology to ensure students are successful in their grade-level content. However, the technological support, instructional strategies, and the usage of specific digital learning systems appropriate for special education learning deficits have been limited (personal communication, August 2021). These concerns must be addressed to provide the foundation needed to sustain a successful integration.

The success and pace of technology integration in the classroom are influenced by teachers' attitudes and concerns towards technology (Yilmaz, 2021). The success of technology integration depends on the level of teachers' confidence, which can limit or assist its integration in everyday courses and activities (Gomez et al., 2021). Thus, the success of technology integration depends on the level of teachers' confidence, which can limit or assist its integration in everyday courses and activities (Chen et al., 2019). Positive attitudes and high levels of confidence in technology integration among educators have been demonstrated to increase student progress (Hartman et al., 2019).

The success or failure of technology integration are determined by personal beliefs, values, and the quality of a person's attitude. Bice and Tang (2022) investigated the connection between teachers' technological practices and their attitudes towards the use of technology. A key indication of technology integration and success, according to researchers, is teachers' personal beliefs and attitudes (Dogan et al., 2021; Eickelmann & Vennemann, 2017). Additionally, internal characteristics, such as a passion for technology and a problem-solving mindset, as well as colleague and administrative support and training, were associated with teacher competency. Teachers' attitudes and

beliefs were not the only barriers; moreover, researchers found that their level of knowledge and expertise also presented a barrier to teachers successfully integrating and utilizing technology (Akram et al., 2022). Rowston et al. (2021) discovered that several outside factors such as the climate's quality and school culture influence the effectiveness of technology integration. These factors included teacher pedagogical beliefs and attitudes, insufficient teacher training, school board financial limits with technology, support, resources, time, and limited technological availability.

Teachers have proven to be more willing to support technology integrations with fidelity when campus support is available, resources are available and accessible, and reasonable time to learn is provided to learn how to use the tools. In addition to familiarity with technology in the classroom, teachers' attitudes and perceptions of its use are also influenced by teachers' experiences with its use in the classroom (Ventouris et al., 2021). Unfortunately, factors beyond teachers' control, such as budget issues, impacting teachers' access to campus initiatives' resources have affected technology integration. Thus, teachers' willingness to fully commit to technology integration is also affected.

Originally, access, assistance, and training were referred to as "first-order barriers" by Ertmer (1999) and represented only a portion of the reasons why technology integration remained low in classrooms. Second-order barriers, also known as the "real gatekeepers" to technological implementation, consist of attitudes, beliefs, knowledge, and abilities that are equally important today. Moreover, the challenges and reluctance to digital integration commonly involved "digital immigrants," according to Manor and

Kampf (2022), were identified as those who were not born in the digital era but eventually adopted the modern technology. However, people born during or after the digital era were referred to as "digital natives." The results of a study found that those aged 65 and over have a good attitude toward adopting learning technology to engage in their everyday activities or hobbies, such as drafting emails or browsing the internet. Despite this, the learning process remained a struggle involving complicated emotions and varied task accomplishments. Sufficient time given will help teachers grasp the new concepts and professional development (Manor & Kampf, 2022).

The classroom pedagogy prevented teachers from understanding the pedagogical advantages of technology. Additionally, the use of technology in the classroom is also influenced by teachers' perceptions of students' technological proficiency (Akram et al., 2022). As a result, the implementation of technology has proven to be strongly reliant on teachers' beliefs, practices, and perspectives of the curriculum, program, and their students. This influences their willingness to integrate technology to enrich the educational experience.

Secondary Special Education Challenges

In today's educational climate, special education teachers are no longer solely responsible for teaching students with special needs. The Individuals with Disabilities Education Improvement Act (IDEA) mandates that classrooms provide the least restrictive environment (LRE) in the general education classroom and provide optimal learning experiences (Jennings, 2018). This requires going above and beyond the prescribed curriculum to ensure that students acquire the skills necessary to participate in

a digital world in a society that is constantly innovating and changing (Green et al., 2021).

Secondary special education teachers are faced with the complexities of blended learning, accommodating, and modifying content-specific curriculum, documenting IEP goals/objectives, and meeting the expectations of the state-wide teacher evaluation program. Considering that exceptional students spend more than 80 percent of their school day inclusive, educators must integrate tools and technologies that enable the success of all their students (Office of Educational Technology, 2017). Thus, professional development is essential for special education teachers. Researchers have agreed that teachers cannot meet school district expectations learning digital components in isolation, such as PK, PCK, and CK (Bouchard, 2019; Mishra & Koehler; 2006).

In an inclusive classroom, special education teachers are sometimes required to serve as mediators between the general education teacher and the student's parents if there is a disagreement over the teaching methods employed. If a student is performing poorly in a class, some parents believe the teacher is not doing their job. The additional tasks, responsibilities, and increased workloads negatively impact working conditions and the school climate. For example, Francisco et al. (2020) noted in an inclusive classroom, special education teachers are sometimes required to serve as mediators between the general education teacher and the student's parents if there is a disagreement over the teaching methods employed, particularly when a student is performing poorly in a class.

Dealing with students' misbehavior is a regular difficulty in teaching special education. Whether it is due to an inability to understand the information or an inability to manage their emotions, some special education students struggle to maintain emotional control (Billingsley et al., 2020). Challenges, such as these, in addition to new initiatives and integrations, can be viewed as overwhelming without the proper support and training.

Technology in Special Education

Several studies conducted over the years have examined how ICT in teaching and learning impacts the learning of children with special needs (Adam, 2019). According to the Individuals with Disabilities Education Act (IDEA), any device used to enhance the functional capacities of people with disabilities is considered assistive technology (Alsolami, 2022). Assistive technology may encompass any piece of software or hardware used to enhance, maintain, or increase the functional capabilities of individuals with disabilities (Ok & Rao, 2019). The rapid improvements in AT in education have many practical implications, allowing teachers to utilize technology to assist their students in achieving the highest educational levels (Metatla & Cullen, 2018). By integrating assistive technology into the school curriculum, educators can support children with special needs. In fact, the primary obligation of a teacher is to offer children good learning experiences, regardless of their limitations, and ensure all students are academically successful.

Teachers are concerned about the lack of information and pedagogical practices regarding how to integrate assistive technology into the regular curriculum. Teachers' experience and training, with the usage of technology in educational settings, are varied

according to students' preferences and can influence teachers' learning process (Bagon et al., 2018). For example, the teaching and learning process has been found to be contingent upon teachers' attitudes toward assistive technology. Ok and Rao (2019) noted that preschool teachers are typically knowledgeable in the use of assistive technology (AT), having adopted attitudes and ideologies that influence their selection of AT for the learning environment. Furthermore, Rahimi and Shute (2021) found that teachers that viewed learning as the consolidation of information were more inclined to regard teaching as the transfer of information, which means they were more likely to utilize exams and tests to facilitate route learning. However, teachers who regarded learning as a conceptual shift, on the other hand, were more likely to be facilitators and encouraged independent student study consistently (Bainbridge et al., 2022).

The Special Education Teacher Role and Technology

According to the National Center for Education Statistics, by 2020, children requiring special education services under the Individuals with Disabilities Education Act (IDEA) would account for more than 14% of public schools. Special education teachers were increasingly relying upon modern technologies to address the needs of children with disabilities (Bowman et al., 2020). Educators can use technology to make education more accessible to all students, build their students' self-confidence, and provide differentiated instruction to ensure that every student, regardless of ability, succeeds. However, monitoring students’ academic progresses are equally important as their use of technology. Rice (2022) noted that the use of technology in special education classrooms

could also keep track of student achievement without interfering with their sense of autonomy.

Teachers found that technology was most useful for tracking and documenting student development, according to (Cagiltay et al., 2019). For example, digital monitoring, video, and other observational technology are tracking strategies used by teachers to keep an eye on student activities without interfering with their progress. Monitoring students using technology has been suggested as beneficial because special education teachers can monitor students' progress and can better tailor the learning experience (Hayes et al., 2018). The use of technology in special education has not been proven to be a one size fits all approach. Thus, ongoing professional development and training are critical for teacher success and student success.

Teachers are critical to the success of technology integration for learning and teaching. According to the TPACK framework, the value of technology comes in a teacher's ability to integrate these technologies into instruction in a meaningful way (Akram et al., 2022). Particularly, teachers of students with special needs are expected and required to demonstrate mastery in implementing and integrating assistive technology as necessary into their students' educational programs.

The necessity for teachers to utilize technology to enhance both teaching methods and student learning has become increasingly apparent. Teachers have overall responsibility and leadership in the classroom. Their expertise and attitude have affected the efficacy of technology integration within the curriculum (Akram et al., 2022). However, the details of the work of the educator in this process have often been ignored.

Teachers' lack of knowledge and confidence have increased as time changes, demands change, and technology changes (Winter et al., 2021). Research has shown that many professional development (PD) programs are effective at enhancing teachers' technology integration in the classroom (Cheng et al., 2020; Er & Kim, 2017). However, the quality of professional development is also important. Researchers argued that high-quality professional development for teachers increases teachers' competence and skills (Cheng & Xie, 2018; Lawless & Pellegrino, 2007; K. Xie et al., 2017).

In light of recent research showing the importance of teachers' values in how they utilize technology, experts have recommended for professional development programs also address instructors' values about instructional technology use (Cheng et al., 2020; Cheng & Xie, 2018; Er & Kim, 2017; H. Kim & Kim, 2017; Liu et al., 2015). Studies have indicated that teachers' opinions about the use of technology in the classroom have a direct impact on how they implement technology in their classrooms (Cheng et al., 2020; Vongkulluksn et al., 2018; Xie et al., 2019); therefore, values and beliefs should be addressed. For example, training programs such as Evaluating Digital Contents for Teaching and Instructional Excellence (Kim et al., 2017; Xie et al., 2017) and Collaborative Professional Development for technology integration address teachers' values and beliefs.

The goal of technology professional development programs and technology integration activities is to maximize available technological resources to promote student learning (NCES, n.d.). The International Society for Technology in Education (ISTE) has developed standards for teachers that serve as recommendations for motivating and

empowering students (2020). ISTE (2020) argued that professional development allows teachers to set personal goals and learn to apply new technology-based pedagogical approaches, model for colleagues and adopt digital resources, collaborate with other educators to create authentic learning experiences with technology, and foster student learning and curiosity through the use of digital resources that maximize students' deep learning. Unfortunately, many technology professional developments for teachers have measured success in terms of "quantity," or the number of programs an individual is able to use in class, instead of student achievement "as a result" of technology (Nicol et al., 2018). There is a need for professional development more connected to the curriculum and student learning.

Teacher Technology Preconceptions

Research continues to be established that teachers are considered key players in the effective integration of technology in teaching and learning. Teachers' self-efficacy and self-confidence play a role in their acceptance of the integration progress (Gale et al., 2021). Individual differences, such as user age, gender, self-efficacy, experience, and education level, as well as external influences, such as policies, job requirements, and access to technological tools, influence these factors (Chao & Liu, 2022). Prior research has highlighted the impact of external characteristics on perceived usefulness and perceived utility. The impact of these elements on usage behavior remains limited (Baturay et al., 2017; Nail & Townsend, 2018). Nevertheless, despite the disproportionate research and focus on educational technologies, research is scarce related to technology integration in regard to teaching and learning (Jandrić et al., 2021).

Siyam (2019) conducted a study using the Technology Acceptability Model (TAM) to investigate factors that influence the acceptance and usage of technology by special education teachers. This study included 24 special education teachers at a private school in the United Arab Emirates (UAE). The research proved that there were external factors impacting teaching and learning and technology integration. The four themes were job relevance, access to technology, self-efficacy, and time.

Job relevance has been a reoccurring theme in previous studies impacting the success and acceptance of technology integration. Siyam (2019) found that the perceptions of special education teachers regarding the significance of educational technology to their teaching techniques positively impact perceived usefulness. Nelson and Hawk (2020) implicated that opinions about the significance of technology were a significant predictor of technology usage. Other studies focused on the influence of beliefs regardless of the complexity of technology. For example, Spiteri and Rundgren (2020) reported that educators must possess the competencies, beliefs, and attitudes necessary to implement technology in the classroom.

Professional Learning Communities

Technology integration extends far beyond the mere use of technology tools and resources but encompasses the actual infusion of technology into content curricula. Technology integration consists of the incorporation of technology into instructional practices with the intended efforts of enhancing student learning and increasing student engagement (Hutchinson & Woodward, 2018; Khan et al., 2017). In doing so, purposeful

planning must take place to bring together the available technological resources and the required content.

Successful professional development can be linked to successful integration practices (Yurtseven Avci et al., 2020). The idea is applicable to professional development efforts concerning technology integration as well. Researchers agree learning is a direct result of doing (Sedova et al., 2019). Learning opportunities allow for participants to engage in hands-on interactions in which they are the facilitators of the learning process. At the conclusion of the learning experience, it is suggested that individuals be required to produce or submit a finished product reflective of the practices embedded in the overall learning experience (Sedova et al., 2019).

Professional learning and collaboration among teachers is an integral part of technology integration and can take place in a professional learning community (PLC) ((Yurtseven Avci et al., 2020). Professional learning communities are defined as groups of persons that interact and learn from one another to grow their professional knowledge and improve their skills in an effort to achieve improved outcomes (Oppi & Eisenschmidt, 2022). The structure and approach for professional learning communities vary within environments; however, one common thread for success and effectiveness is for teachers to engage in self-reflection concerning their instructional practices to improve student learning and performance.

PLCs can be the vehicle for teacher advancement as teachers learn from one another during their time together. The development of interpersonal trust is viewed as a critical feature of a PLC (Oppi & Eisenschmidt, 2022). A focus on student learning,

analytical results, and collaborative culture are major components of a PLC that also function as job-embedded professional learning for teachers (Dufour, 1998). This analytical viewpoint also has outcomes for how information is defined and created, including the way teachers know the content they teach (Admiraal et al., 2021; Campbell & Lee, 2017).

Summary and Conclusions

For more than four decades, digital technologies in teaching and learning outcomes have become prominent in education. This chapter presented an overview of the literature related to the shifts in education including the digital components in education. It began by describing how the United States seeks ways to address and provide high-quality education. It then discussed how ESSA mandated all states to create a comprehensive educational plan that included competency-based learning. In addition, ESSA regulations mandate equitable technologies are utilized for special education students. The chapter then contained a discussion of 21st century schools and technological advancements in education. The review then explored the traditional teaching models and technology often referred to as blended learning model. The blended learning model provided students varied opportunities to be collaborative with their peers, to be actively engaged with other students across the nation or globe. Various technology models such as RAT, SAMR, and PICRAT were discussed as ways to integrate technology. What was revealed from the review of literature is that there are numerous ICT and technological instructional supports for elementary students; however, limited literature exists to provide specific technology integration for teachers supporting

secondary special education students that are not identified as severely disabled. This chapter also explored the obstacles teachers are confronted with such as lack of classroom equipment, insufficient professional development, and lack of time to perform all the roles and responsibilities of a secondary special education teacher. Teacher willingness and beliefs directly impact technology integration in their classrooms. The review of literature explored how secondary special education teachers' responsibilities included such complexities as blended learning, IEP goals/objectives, content-specific curriculum, and meeting the expectations of their state teacher evaluation program. Because these complexities were discovered, secondary special education teachers do not meet school districts' digital learning expectations.

Chapter 3: Research Method

The purpose of this research study was to investigate secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affected their technology integration decisions. This basic qualitative study sought to understand technology integration and how TPACK influences teachers' decisions to implement classroom instruction. This chapter includes descriptions of the research design and rationale, the role of the researcher, the methodology, the trustworthiness, and ethical procedures. The discussion of how participants were selected, and data was collected for this basic qualitative study is included in this chapter. The research study solicited participations from the current TSD1 secondary special education teachers employed with the school district since the year 2021 when the district-wide technology initiative was implemented. The academic school year of 2021 was used an employment reference for all participants with the assurance that all participants in the study had the opportunity to have utilized technology integration in their classroom in accordance with the district initiative.

Research Design and Rationale

This basic qualitative study involved research procedures and practices in terms of how secondary special education teachers perceive technology integration and its use in classroom instruction. The research questions listed below guided this study:

RQ1. What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?

RQ2. How do secondary SPED teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?

A basic qualitative research design was used to complete the research study. Merriam and Tisdell (2016) asserted that basic qualitative research designs can use the following data types, interviews, observations, and document analysis. People's beliefs, values, and interpretations of how they make sense of what they are experiencing contribute to the phenomenon of qualitative research (Merriam & Tisdell, 2016). The study focused on secondary special education teachers' descriptions of technology integration and its use in the classroom. This study took an in-depth look at perspectives aligned with the problem and purpose and provided the rich descriptions needed to answer the research questions using the basic qualitative research design.

While quantitative and mixed method research approaches were explored, both options were inappropriate for the research because the study did not use surveys or other quantifiable instruments as a method for data collection. Open-ended semistructured interviews were used to collect data. As supported by Merriam (2009), individual experiences contribute to constructs of understanding and meaning of a phenomenon in basic qualitative research studies (Merriam & Tisdell, 2016). This methodology section includes the research method of selecting participants, the characteristics of the population of teachers recruited to participate, instrumentation, data collection, and data analysis. The Institutional Review Board (IRB) gave the approval to proceed with the basic qualitative study.

The phenomena of this basic qualitative study assisted with gaining a better understanding of technology integration in the secondary special education classrooms and its instruction. According to Creswell (2008), qualitative research provided a deeper approach of a central phenomenon. Therefore, the qualitative research was intentional. According to Burkholder et al. (2020), qualitative research is best understood when the phenomena are explored in their natural setting, which was the classroom for this study. Merriam and Tisdell (2016) and Ravitch (2016a) used qualitative methods to describe the interactions between individuals, groups, entities, and communities. Using a basic qualitative approach assisted in terms of analyzing the special education teachers' perceptions of technology integration for middle and high school students. Individual experiences and how the participants explained their exploration in the research through the interview was viable (Carl & Ravitch, 2018).

Many qualitative research approaches were considered for the study; however, several were found unsuitable. Research designs such as ethnographic, case study, narrative, and grounded theory were alternatives to the research approach used for this basic qualitative study (Huyler & McGill, 2019). The ethnographic approach was a core inquiry considered for this study. Ethnography occurs when the researcher immerses themselves in the environment of the participants to derive meaning and understanding to the interaction between individuals (Merriam & Tisdell, 2016; Ravitich, 2016a). While teachers' experiences were needed for this research study, such an approach would have required fieldwork, there was also a need to perform numerous observations over an

extended period for comparative analysis to explain the data collected. Therefore, ethnographic study was eliminated as a research approach option.

A narrative research approach was also considered for this study. According to Creswell (2013), the narrative research approach tells a story and describes the experiences of the individuals studied. While teachers were responsible for providing a story of their experiences through interviews, the narrative approach would not be an appropriate research design. For the basic qualitative study research design, the study used semistructured interviews to gain an in-depth understanding of the perceptions of secondary special education teachers and their willingness to routinely integrate technology within their content-specific lessons. A basic qualitative approach addressed secondary special education teachers' perceptions of technology integration and its use in classroom instruction.

A case study or phenomenological approach was not used because this research study does not include focus groups, artifacts, or direct field observations. However, they differ when space and time are entered into the research. According to Yin et al. (1982), case studies utilizes generalization that can be interpreted to a larger population. Open-ended semistructured interviews will be the only method of data collection and the time frame is limited for this basic qualitative research. Merriam and Tisdell (2016) stated phenomenological studies focus on small groups and the commonalities among the participants. Therefore, case study and phenomenology study were eliminated as research approaches for this study.

Grounded theory was an additional viable contender for this study but was rejected as a research design method. The grounded theory includes the development of theoretical ideas formulated from data collect through relationships that are rationalized among multiple concepts (Ravitch & Carl, 2016). The findings from this study were not derived from volumes of data collected over time, instead, this study produced thick-rich and descriptive understanding of how TSD1 secondary special education teachers describe technology integration in the secondary special education classrooms and its instruction.

Role of the Researcher

I participated in various roles for this study such as data collector, interpreter, analyst, and observer. For example, as a data collector, the subjectivity from various perspectives was considered. According to Bazen et al. (2021), the role of the researcher is to convey the tone, feelings, beliefs, and values through questions that reveal the experiences of participants. I interpreted and analyzed data using visual and auditory responses during the semistructured interview process. Participants were reminded that participation is only voluntary, responses were kept confidential, and sessions were recorded only for the purposes of later transcription. During semistructured interviews, a professional setting was maintained. After the interviews were recorded, I coded and analyzed the information.

I also have a role in the school district as a secondary special education instructional specialist. I am not responsible for district subject content and technology implementation. In the role of special education instructional specialist, my primary

responsibility includes providing instructional support to special education teachers with specially design instruction (SDI) for special education students in the resource and collaborative teaching classrooms. SDI refers to the idea that special education teachers adapts "the content, methodology, or delivery of instruction (i) to address the unique needs of the child that results from the child's disability and (ii) to ensure access of the child to the general curriculum" (IDEA Act, 2004). IDEA further clarified that SDI is appropriate for any level of instruction including a collaborative teaching setting. I was not responsible for the selection and professional development trainings teachers are given by the district. Potential barriers included a clear separation of my role at the local district as a special education instructional specialist and the role as the lead researcher. Although the separation of roles can be viewed as challenging, it was important to note my role within the context of this work with teachers and principals understanding my role and cross functional roles would not exist. Therefore, following program reviewer feedback, a meeting was held with Walden University's IRB to discuss the research study and my role in the district. Following the discussion, it was advised to continue with the study as special education teachers' evaluations and supervision are the responsibilities of the campus administrators. Site authorization to conduct research in TSD1 was sought and received.

Participants in the basic qualitative study were secondary special education teachers, most participants were resource or collaborative teachers within TSD1. There were no personal relationships between the participants and me. The problem was chosen to analyze the school district blended learning initiative and the state accountability

report. The beliefs regarding special education academic performance and technology integration towards improving the teaching and learning process from me could be labeled as bias. Therefore, peer-reviewed, researcher bias, and member-checking were used to address any issues. In addition, personal views of participants were separated when the interview responses were transcribed and interpreted during data collection.

Researchers can avoid plagiarism and deception by being truthful (Yin, 2018). The integrity of the research was maintained through professional and ethical relationships. Researcher's integrity and values were important to the research design, implementation, data collection, and findings (Ravitch, 2016). Researchers must have an ethical obligation to exhibit skills, knowledge, and sensitivity to interact and establish a relationship with their research participants (Creswell, 2013). In the current study, it was crucial to understand the trustworthiness and ethical procedures required to maintain rigor and credibility contributing to the body of work.

Methodology

Qualitative research deepens the knowledge of educational practices (Merriam, 2009). This basic qualitative study used special education teachers' descriptions to gain a deeper understanding of technology integration in secondary classrooms. Therefore, the study used qualitative research methods to conduct an in-depth view of secondary special education teachers' perceptions and their technology usage in classroom instruction.

Participant Selection

The qualitative study took place in TSD1, located in the southeastern region of Texas with an enrollment of 21,000 students. TSD1 services approximately 180

secondary special education students with SDI. TSD1 employed approximately 70 secondary special education teachers that teach in a resource and collaborative teaching setting. Participants were purposefully sampled for this basic qualitative study. The participants were invited to participate. Purposeful sample was chosen to support a deeper focus on the phenomenon studied and assisted with the selection of participants important to the study purpose (Burkholder et al., 2020). Based on the number of responses to the initial invite for participants, the study focused on selecting and accepting the first qualified 15 participants or until saturation was met to fulfill the phenomenon of this research study. Research saturation for qualitative studies are geared towards assessing sample size versus the adequacy of the data (Hennink & Kaiser, 2022). According to Merriam and Tisdale (2016), qualitative studies do not have a required minimum number of participants. The main goal in the study was to gain a better understanding of the phenomenon. Therefore, relevant information had the highest priority. All participants were currently employed as secondary resources or collaborative special educations at TSD1 by the year of 2021 when the Blended Learning Initiative was introduced (personal communication, TSD1, August 5, 2021). Because all participants were employees of TDS1, the special education teachers were in possession of TSD1 issued laptops or Chromebooks, therefore access to digital tools and educational technology was available. Furthermore, TSD1 is a 1:1 device district for all secondary students and staff. As a result, all teachers were required to attend educational technology training to ensure usage and common knowledge establishes homogeneity (personal communication, TSD1, August 3, 2021). By selecting participants that were currently

secondary special education teachers who have received technology training and understand TSD1 technology integration expectations in the classroom, the number of participants necessary to meet the maximum information relevant to the study was minimized.

Instrumentation

A participant interview protocol was used to collect data for this study (see Appendix B). There were two components that were the focus of the semistructured interview questions: technology integration and TPCK. Secondary special education teachers' perception of technology integration and its use in classroom instruction were targeted, therefore, the questions regarding this concept were implicit. A field test was conducted with four secondary special education teachers from a school district other than TSD1 to provide practice using the protocol and to gain feedback on questions. Because the participant protocol was developed in this study, a field test was conducted to enhance trustworthiness.

Six field test participants were invited to participate in the field test of interview questions. Four of the six participants agreed to participate. Each field test participant was emailed an invitation to participate in a video conference call to be interviewed. Once the participants agreed to participate in the study and a participant's questionnaire review rubric was emailed. Layering the categories of questions was incorporated during the interview process. According to Rubin and Rubin (2012), when researchers use the main question for category one, follow-up questions for category two, and probing questions for category three to guide the interview, this process creates an interview

dialogue. A video conference link was sent to the field test participant. Participants were labeled as “Field Test Participant #1, 2, 3, and 4” to conceal participant’s identity. Therefore, on the video transcription and the question rubrics and responses, the same labeling was used to distinguish the participants. No data from the practice field tests was used in the study.

The interview protocol was changed based on the feedback from the field test participants (see Appendix C). Question #2 was not clear for most participants; therefore, the question was removed. An additional question was added to ask participants what technology programs they currently use in their classroom and why. Interviews allow researchers to collect in-depth, individualized, contextual, and rich data (Ravitch & Carl, 2016). Multiple questions asked in one during the field test causing the interviewer to notice wait time and additional explanation should not be infused in the dialogue.

Gough et al. (2017) noted the lack of research regarding K-12 digital learning. Special education teachers’ perceptions of technology integration will contribute to the phenomena and will provide valuable information to K-12 dialogue. Interviews will serve as the data collection tool for this basic qualitative study. Glesne (2011) wrote that the researchers’ opportunity to understand seen and what is not seen when special interviews are used. Semistructured, one-on-one interviews were used for the current study. According to Ravitch and Carl (2018), interviews provide the researcher with rich, contextual data that are crucial to qualitative research. Ravitch and Carl expressed that the interviewer could gain great insights to the studied phenomenon based on the participants’ real-life experiences. Therefore, semistructured interviews supported

facilitation of data collection regarding teachers' technology integration in the secondary classroom setting. The participants were asked to participate in a 30-40-minute semistructured interview via Zoom. A linked list connecting actual names, contact information to their pseudonym participant number for labeling and coding was created and kept in a locked box in my office. The interviews were recorded for transcription. With videoconferencing, participants had the opportunity to be more flexible with time therefore the possibility of agreement. According to Khan and MacEachen (2022), videoconferencing is widely accepted globally for data collection.

Yin (2014) stated that interviews provide vital data collection information that cannot be obtained through observations. However, Creswell (2012) maintained that interviews may lend way to information disseminated through the lens of the researcher which can lead to whether the individuals' responses are trustworthy. In the current study, an interview protocol with 12 open-ended questions was used to explore the secondary special education teachers' perception of technology integration and its use in the classroom. The interview protocol aligned with the research questions. According to Yeong et al. (2018), good qualitative data is obtained by using reliable interview protocol. With a series of pre-made questions and follow-up probing questions developed to extend dialogue in order to make sense of the participants' experiences and their understanding varied perceptions occur within the context of the participant group (Carl & Ravitch, 2018). The pre-made and follow-up probing questions were field tested with special education teachers from another school district. Revision and editing of the semistructured questions occurs based on the teachers' feedback when field test questions

are administering to a smaller sample of teachers from another local school district (Creswell, 2008). Semistructured interviews allowed for the gathering of thick rich data necessary to explore how secondary special education teachers integrate technology into their classroom instruction. The interview data were coded into emergent themes and their relationships to the research questions and follow-up questions.

On the day of the interview, one-hour time blocks were scheduled outside of non-instructional time. The teacher was provided an emailed link to join the videoconference. The interview protocol was followed. Each session was recorded for later transcription. Using recordings and interview protocol minimizes ethical issues that may bring harmful effects on the participants (Creswell, 2013; Yin, 2014). Following each interview, each participant was emailed their video conferencing transcript for review to verify and update any changes. Notations were made in a reflective journal as a cleansing mechanism of any bias (Oliphant & Bennett, 2020).

Participants' identities were protected by creating pseudonyms, such as participant 1, 2 and 3. Data was collected and stored in accordance with Walden's IRB procedures. My reflective journal was kept in a locked box in the home office. All participants' identities, aligned with their pseudonyms, were also kept in a locked box. A USB drive was used to house all other data collected for this research study. All data will be securely destroyed five years after the conclusion of the study.

Procedures for Recruitment, Participation, and Data Collection

The initial step prior to research was to seek approval from the university review board (Carl & Ravitch, 2018). Permission was sought and received from the TSD1

Academic Research Committee prior to seeking approval from Walden University's Institutional Review Board. Once all approvals were granted, an email was sent to all secondary special education teachers working in the capacity of resource or collaborative teachers in TSD1. The email provided the purpose, nature, and criteria of the basic qualitative study. The recipients were invited to participate once a special education teacher criterion was met. An informed consent form was attached to the emails and signed electronically via DocuSign. A link was also provided to the participant to schedule the personal interview time via Calendly. The informed consent form included my contact information, such as cellular telephone number and university email address, so participants could contact me if they had any questions or concerns before the scheduled interview. The qualified participants were notified via email to confirm their scheduled interviews. The final transcript review step included a copy of the interview transcript emailed to each participant. Additional meetings were scheduled to discuss the interview data. Upon completion of the first interview, a copy of the interview recording, and protocol was shared with my chair to authenticate the data collection process.

Alternative research plans were created. This plan included resending the email inviting secondary special education teachers working in the capacity of resource or collaborative teachers to participate in the study again, if there were not enough participants in the study. An additional plan entailed asking all participants who agreed to participate in this study if they could refer any teachers to the study. The referred teacher was contacted via email and sent the invitation to participate. Although created, these alternative plans were not utilized for this research study.

Data Analysis Plan

Braun and Clarke's (2006) six-phase process for inductive thematic analysis was used in this basic qualitative study. They defined a theme as something important captured as data related to the research questions. Thematic analysis lends way to identifying, analyzing, and reporting themes within data (Braun & Clarke, 2006). Braun and Clarke also shared that thematic analysis was developed as a research tool to support teaching and psychology and provide flexibility. Data analysis involved exposing the layers of information to gain a deeper understanding of the problem (Creswell, 2009). Furthermore, clarity around the analyzing process is explicitly needed to explain the research study's thematic analysis (Braun & Clarke, 2006). Each participant's information connected to the interview questions were documented as a level of patterned responses within a data set. For this reason, the research question number and category were transferred to simplify coding. A rich descriptive analysis was provided for the study data set. Organized and prepared data attributed to the success of the research study (Lodico et al., 2010). The phases of thematic analysis were followed step-by- step: (1) familiarize yourself with your data; (2) generate initial codes; (3) search for themes; (4) review themes; (5) define and name themes; and (6) produce a report (Braun & Clarke, 2006).

An inductive approach was used for the data analysis is crucial to the qualitative research process (Merriam & Tisdell, 2016). A thematic analysis was used to draw meaning from the data collected. Key terms such as blended learning, teacher perceptions, digital tools, ICT, TPACK, and other educational technology were

identifiers associated with similar secondary classroom instructional phenomenological categories. Data was categorized to identify findings to analyze, report patterns, and emerging themes. TPACK conceptual framework guidelines for answers were categorized according to the research questions (Koehler & Mishra, 2009). Technological and pedagogical knowledge interconnectedness to technology integration in the classroom lends ways to the emerging themes for this research study. All themes and participants' information were present during the interviews including outliers.

The anticipation and preparation of coding qualitative interviews were vital to any information that is discrepant from any list or inconsistent with other participants (Merriam & Grenier, 2019). Saldaña and Mallette's (2017) environmental coding was considered for this study but not used as a viable option. However, *The Coding Manual for Qualitative Researchers* and the categories and codes has been updated from Saldaña's (2009) general guidelines and used with coding methods. SPELIT environmental analysis acronym stands for Social, Political, Economic, Legal, Intercultural, and Technological (SPELIT). The primary purpose of using SPELIT data analysis was to determine what is the phenomenological inquiry that connects to the multidimensional analysis (Saldana & Mallette, 2017). SPELIT was considered for data analysis but not deemed appropriate for this qualitative study. Data analysis that supports the factors of SPELIT; social incorporates people engagement, political refers to the presence of power, economic explores the resources for products and consumables, legal involves the IEP goals and law, intercultural includes factors of collaboration in an educational setting, and technology included the technical advancements of education in

the classroom. Based on the secondary special education teachers' responses, keywords and terms was placed in perspective SPELIT categories, however, this research study was not utilized the phenomenological inquiry.

In this study, Braun and Clarke's (2006) 15-point checklist was used to ensure a proper thematic analysis was conducted. According to Braun and Clarke, the 15-point includes check offs in the key areas of transcription, coding, analysis, overall analysis, and a written report. All interviews were recorded and transcribed by a videoconferencing platform used. Also, I viewed and reviewed all interviews, field notes per participant. Initial codes were created for initial coding, however, flexibility in coding occurred as data set construct. All data sets were interpreted based on each participant's descriptions to reflect the rich experiences of the teachers. Finally, a professionally written report was viable to document the thick rich descriptive data presented for this basic qualitative research.

Trustworthiness

Qualitative research involves the insurance of credibility, transferability, dependability, and conformity. Choosing certified secondary special education teachers that are engaged in resource and collaborative teaching environments enhanced credibility of this study. The ability to establish repeatability with qualitative research creates trustworthiness (Buckley et al., 2022). Establishing sound research questions and designs that can be implemented with cross-dimensional research created transferability. The utilization of peer-review and university articles validated protocols and procedural guidelines extended consistent research and extended dependability. Identified safeguards

and protection against bias and potential barriers ensured findings presented were reliable and trustworthy.

Credibility

Credibility was an important component that establishes the trustworthiness of research studies (Lincoln & Guba, 1985). Transcription review was used to validate the accuracy of the interviews. The process of transcript review occurred when the data collected during interviews were documented verbatim and given to the teachers to validate the accuracy of the responses (Creswell, 2013; Merriam & Tisdell, 2016). In this research study, the recordings were hand coded according to general word groups, field notes were maintained and all rationale for decisions were notated to maintain credibility.

Transferability

Transferability was defined as the repeatability of present study outcomes duplicated for future research studies (Merriam, 2009). The ability to replicate studies provided valid outcomes for research. Merriam and Tisdell (2016) argued that the reader determines the transferability of findings for studies and not the investigator. However, they also suggested that the investigator should not be aware of future study outcomes when conducting their study.

Dependability

Dependability is a process that similarly allows research to be conducted as planned (Guba & Lincoln, 1992). Therefore, field notes and documentation of other pertinent information for the study is viable for me. Reflexivity will be a high priority for me to maintain dependability.

Confirmability

Confirmability used in qualitative research is like the usage of validity in quantitative research. Confirmability occurs when the reader interprets the study findings and is not affected by the researcher's biases (Lincoln & Guba, 1985). Merriam and Tisdell (2016) argued that researchers must exhibit bias in their final report. A way that I alleviated the feelings of biases was to quickly return the recording transcripts to participants as a validation. Also, I wrote items of information that could help future special education professional developments.

Ethical Procedures

Ethical considerations and standards recommended by the Office of Research and Doctoral Service at Walden University were used for this basic qualitative study. Paper-based data will be shredded, and all electronic data will be deleted and wiped clean to the point of removal from all hardware five years following the conclusion of this study. Approval was obtained prior to the recruitment process or data collection for this study. Adherence to any privacy policies and informed consents for the participants were followed. All signatures and permission required were completed and all participants were reminded that could withdraw from the study at any time. All research material was secured in a locked storage and identifying information was redacted from interview forms. This study's participants' data will be destroyed five years after the study completion. All protocols were established to maintain confidentiality for this basic qualitative study.

The Belmont Report provide key principles such as research misconduct policies, research falsification, and research protection of the public's health when ethical procedures are considered (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). Redman and Caplan (2021) argued *The Belmont Report* provided no maleficence for the research subjects to which harmful effects should be avoided for research participants. The normative document was created for the protection of research subjects, therefore, ethical procedures must include an informed consent form with all research (Tal-Alon & Shapira-Lishchinsky, 2019). Tal-Alon and Shapira-Lishchinsky (2019) further explained the normative document was created for research purposes and continues to be regulated by U.S. Office of Research Integrity. Falsification, fabrication, or plagiarism of research materials, equipment, and process, or changing or omitting data from research will automatically void the research. Finally, *The Belmont Report* supported organizations, professional boards and research institutions with regulating research ethical procedures and processes (Anabo et al., 2019). For this research study, Walden University's IRB was the regulator of ethical procedures.

Summary

This chapter revealed the research design, researcher's role, the methodology, ethical considerations, trustworthiness for this study concerning the secondary special education teachers' perceptions of technology integration and its use in classroom instruction. This section provided a description of teacher recruitment, protocol to gain informed consent, the recording of interviews, and list of interview questions. Data was

collected through interviews, transcribed, and coded using the six-phase guide to thematic analysis to identify emerging themes and patterns. Chapter 4 and Chapter 5 will include the analysis of the data and the findings of the research.

Chapter 4: Results

The purpose of this basic qualitative study was to investigate secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. The problem addressed in this basic qualitative study was secondary special education teachers' descriptions of technology integration regarding their subject-content expertise and the factors that affect their technology integration decisions. The phenomena of this basic qualitative study assisted with gaining a better understanding of technology integration in the secondary special education classrooms and its instruction. Schools strive to bridge the gap between teachers' and students' grasp of today's rapidly growing educational technologies. Moreover, secondary teachers' opinions of technology integration vary with regard to the implementation of technology and influence the success of the integration process (Akram et al., 2022). Change is difficult for some teachers; therefore, their professional development needs will vary, especially in special education (Darling-Hammond et al., 2019).

The study sought to answer two research questions (RQs). The research questions that guided the study were as follows:

RQ1: What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?

RQ2: How do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?

The following section of this chapter is a discussion of the setting of the study and participant demographics. This chapter includes a description of data collection procedures, followed by a discussion of data analysis steps, and a discussion of the evidence of the trustworthiness of the data. The last section of this chapter is a summary.

Setting

The setting for this study was in secondary schools in a mid-size school district in Texas. Secondary special education teachers from these schools were selected to take part in the study. The participants were not influenced by any organizational or personal conditions. Moreover, no such conditions influenced their experience at the time of study since there were no budget cuts, changes of personnel, or other trauma. Therefore, the interpretation of the results of this study was not influenced by organizational or personal conditions.

Descriptive Data

There were 15 participants in the study, making up a participant group with diverse ethnicities. The participants were teachers in secondary schools in a school district in Texas. Both male and female teachers participated in the study. Regarding the characteristics that were relevant to the current study, it was important that each participant was a secondary special education teacher from a middle or high school. Furthermore, the participants were each required to have an experience of at least five years as a secondary special education teacher and taught during the pandemic. This was important since lack of experience would have meant that the participants could not provide the relevant data that was needed for this study. The real names of the

participants were known to the researcher. However, since confidentiality of participants was paramount in this study, the use of pseudonyms was an important consideration. As a result, the researcher created pseudonyms for each participant that were used in place of their real names. Assigning a pseudonym to each participant ensured that their identity was protected. Each of the 15 participants stated that they were willing and prepared to engage in the semistructured interviews that lasted for a period of 30 to 40 minutes. Most of them were in their 40s in terms of age. The demographic information of the study participants is summarized in Table 5.

Table 5

Interview Participant Demographics

Participants	Subject Taught	Years of Experience	Gender
Participant 1	English	5 years	M
Participant 2	English	5 years	F
Participant 3	English, Social Studies, US History	8 years	F
Participant 4	Algebra, Biology	5 years	M
Participant 5	Math	13 years	F
Participant 6	English	5 years	M
Participant 7	English, Arts	21 years	F
Participant 8	Reading, Math	7 years	F
Participant 9	English	11 years	M
Participant 10	Math	5 years	F
Participant 11	Math	5 years	M
Participant 12	English	19 years	M

Participant 13	English	16 years	F
Participant 14	English	16 years	F
Participant 15	Math	11 years	M

Data Collection

For the collection of data to answer the research questions, 15 participants were recruited. The number of participants allowed the researcher to conduct in-depth semistructured interviews. The individual interviews were conducted online through Zoom and lasted for a period of up to 40 minutes. The interview data was recorded with the use of the default Zoom voice recorder which allowed the researcher to record the online Zoom meetings. Recordings were transcribed by Zoom software, resulting in individual Microsoft Word documents in 12-point, single spaced, Times New Roman font data. Information on the data collected for each participant is listed in Table 7.

Table 6

Field Test Participant Demographics

Participants	Subject Taught	Years of Experience	Gender
Participant 1	Science	21 years	M
Participant 2	English and Math	6 years	F
Participant 3	Social Studies, US History	8 years	F
Participant 4	English, Math	4 years	F

Six participants were invited to participate; however, only four participants accepted the invitation to participate in the research study see Table 6. Field test participants were used from another school district to provide practice using the interview protocol (see Appendix B). A field test data form was developed and used to conduct the field test interview protocol to enhance trustworthiness (see Appendix C). Clarity and conciseness of the research interview protocol was established.

Table 7

Participants' Interview Transcripts

Participants	Date Interviewed	Duration	Pages of Transcription
Participant 1	05/24/2023	22 minutes	6
Participant 2	05/25/2023	34 minutes	7
Participant 3	05/25/2023	38 minutes	8
Participant 4	05/30/2023	36 minutes	8
Participant 5	05/30/2023	28 minutes	7
Participant 6	05/31/2023	35 minutes	8
Participant 7	05/31/2023	32 minutes	7
Participant 8	05/31/2023	40 minutes	8
Participant 9	06/01/2023	39 minutes	7
Participant 10	06/01/2023	34 minutes	7
Participant 11	06/07/2023	35 minutes	7
Participant 12	06/07/2023	38 minutes	8
Participant 13	06/08/2023	40 minutes	9
Participant 14	06/25/2023	38 minutes	8
Participant 15	06/25/2023	36 minutes	8

Permission was first obtained from the participants before the recording. For backup, notes were taken with the use of paper and pen in each interview. This was important in the event the digital voice recorder and all the digital data became lost.

There were no variations in data collection from the plan presented in Chapter 3. More specifically, the plan was to interview 15-20 participants as outlined in Chapter 3, and 15 were interviewed. This number of participants allowed the researcher to reach data saturation. During the interview, the interview protocol was used as designed, and probing was done by asking follow-up questions. This was particularly appropriate when the researcher had not fully understood a given response, when the answers were ambiguous or vague, and when the researcher wanted to obtain more detailed or more specific information. No unusual circumstances were encountered during the collecting of data.

Data Analysis Procedure

Hand coding was initially established using verbatim transcripts from video conferences. Participants confirmed the data used from the video conferences transcripts. Next, verbatim transcripts of the 15 individual interviews were analyzed in NVivo 12 qualitative data analysis software. The data analysis procedure applied to the data was Braun and Clarke's (2006) inductive, thematic method. The procedure had six steps, including: (1) familiarizing yourself with your data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the results (Braun & Clarke, 2006).

Phase 1: Familiarizing Yourself With Your Data

The first step of the analysis involved familiarization with the data (Braun & Clarke, 2006). Prior to analysis, the data was member checked. After collecting data from the participants, the researcher returned the data to them to check for accuracy as well as resonance with their experiences. All the 15 participants confirmed that the data gathered from them was accurate. I read and reread the resulting data sets in full. The researcher made handwritten notes as regards points of potential analytical interest, including repeated ideas and phrases and key words, from which codes were potentially developed in the second step of the analysis.

Phase 2: Generating Initial Codes

The second phase of the analysis involved generating the initial codes (Braun & Clarke, 2006). The 15 individual semistructured interviews yielded 596 initial codes (see Appendix D). Each of these codes reflected a piece of information from a respondent that was then condensed as the process continued.

Initial codes were then condensed by combining words and phrases that expressed similar meanings. Those codes were then labeled with descriptive phrases that indicated the meaning of the data assigned to them. For example, when describing technology integration at the secondary education level, Participant 11 stated that, “It's, I think, at full capacity we've gotten completely away from paper and pen work. We do not utilize textbooks anymore. Everything's completely online.” Similarly, Participant 14 stated, “We use technology for every assignment that we do these days. We have been using more technology. And so, we are at the point where it's difficult to have an assignment or

an activity that does not use technology at this point." Both responses indicated that there is heavy integration of technology at the secondary education level, so both responses were assigned to the same secondary code, which was labeled, 'heavy technology integration.' In total, the 596 initial codes were condensed into 45 secondary codes (see Appendix E).

Phase 3: Searching for Themes

The third step of the analysis entailed grouping codes to form themes (Braun & Clarke, 2006). The researcher grouped codes to form themes. When different codes indicated various aspects of the same broader, overarching idea, the researcher identified them as related and clustered them to form a theme. For example, the three codes, digital shift in education is good, pandemic compelled teachers to use technology, and surge in technology integration due to COVID-19 pandemic were grouped into one theme because they all indicated that the digital shift in education and the COVID-19 pandemic was a factor that influenced their instructional decisions to integrate technology into lessons for their students. Additionally, the three codes 'training helps with integration,' 'provided with adequate training with pedagogical knowledge and technology', and 'professional development helps with technology integration' were grouped into another theme because they all indicated that training and professional development that prepares teachers for the integration was a factor that influenced their instructional decisions to integrate technology into lessons for their students (Jaipal Jamani & Figg, 2013; Mishra & Koehler, 2006). In total, the 45 secondary codes were clustered into the following ten

initial themes (see Appendix E). Similar words and word clusters were merged to form the emerging initial themes mind map (see Appendix F).

Phase 4: Reviewing Themes

The fourth step of the analysis consisted of reviewing the themes (Braun & Clarke, 2006). The researcher cross-checked the themes against one another to ensure the ideas they represented did not overlap. The process of cross-checking the themes included the reviewing of cluster themes to the original data to ensure the codes indicated patterns in the responses from the participants and that the responses did not change the intent of the participants' response. There were no changes because of this phase of the analysis, and the ten themes that emerged remained intact (see Appendix F):

Table 8

Initial Theme Codes

Initial Themes
Lesson Plans
Digital Shifts
Technology Access
Resources
Professional Development
Tech Tools
Challenges
Pedagogical Knowledge
Technological Knowledge
Content Knowledge

Phase 5: Defining and Naming Themes

The fifth step of data analysis involved defining and naming themes. Each them was defined and identified on a paper post-it (Braun & Clarke, 2006c). Next, detailed analysis was created for the final themes analogous to the participants' responses. As follows are the words and responses from the participants in this study. Finally, the four themes emerged from the ten initial themes as reflected in Table 9.

Table 9

Determining Final Theme

Initial Themes	Final Themes	Participant Responses
Digital challenges, COVID, pandemic more technology Open Eyes Practice to increase their technological knowledge	Digital Shift	"Digital shift in education and impact on your technology integration and the ability to teach your students " "Going to trainings and asking questions when I don't know how to use something and getting somebody to show me, and I practice it to get better"
Tech lesson Plans, Differentiated lessons, Tech trainings, Collaboration, Hands-On	Professional Development	"When the district adds new software for various programs, as educators new extra training even though we know technology"
Computer equipment, Tech programs, Tech implementation Integration Benefits	Technology Tools	"Certain concepts that we teach in math are pretty difficult to teach or access with certain technologies like Chromebook"
Technological Knowledge, Pedagogical Knowledge Content Knowledge	TPACK	"Comparing technology and pedagogy, they are intertwined, and I feel comfortable as a teacher but not as a special education teacher"

Phase 6: Producing the Results

The sixth phase of data analysis involved presenting the results, which will be shared later in this chapter. The final theme is also about writing up a report. The endpoint of research is often some sort of report, such as a dissertation or journal article (Braun & Clarke, 2006). For the current study, the endpoint is this dissertation. The sixth step of data analysis involved presenting the results, which will be shared later in this chapter.

Results

The current study sought to explore secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. This section provides a presentation of the results. The findings are presented in detail. In total, four themes emerged from the data. The results of the data analysis are organized by the research questions. The themes are summarized in Tables 10 and 11 shown below:

Table 10

Teachers' Perceptions of Technology Integration Instructional Influences

Research Question	Emerged Theme
What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?	Technological Tools and Tech Practice Professional Development Digital Shift, Covid-19, and Benefits of Technology Integration Lessons

Table 11

Teachers' Perceptions of Technology Integration Instructional Influences

Research Question	Emerged Theme
How do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?	Use of Technological Pedagogical Content Knowledge

All participants were given participant numbers to remain anonymous. Pseudonym identifiers were used throughout the research study. To answer the research questions, I used the identifying markers at the end of the interview protocol questions to link the responses (see Appendix B). The results were documented according to the responses to the questions.

The initial hand coding stemmed from basic words and word grouping from teacher transcripts. For example, the obvious common words were Google, EdPuzzle, and other well-known educational computer platforms (see Appendix D). Next grouping of codes was "technology related" terms such as software, tech tools, and artificial intelligence. The process of group continued until all 15 transcripts were reviewed. As a result, 596 codes were initially hand coded.

Some participants referred to the knowledge gained from their students. One participant stated their eyes had been opened to the digital shift in education. Another participant stated that there were times that the students had to assist them with technology because of the 21st century technology skills students possess. Participant #5 said:

I think it's good that we were kind of shifting towards digital resources because the world itself is shifting to digital resources. And ultimately, our job is to prepare students to strive and succeed in the world. You know, I think that, you know, as that happens, the older generation, which I'm slowly becoming a part of, need to keep up with the modern stuff. So, it's good for us to stay up to date on new technologies and the things that you know the world is going to.

Participant #9 did not agree with the use of technology. The participant said:

> Um. I'm not really a fan of the digital shifts, miss paper and pen. I think as for me, personally special needs students need to make use of their hand because they tend to get distracted with the Chromebooks. They'll watch movies. And I mean, Gen Ed, students probably do it too. But especially students definitely get distracted with all the technology. So, I think the shift, I don't know that it's helped the subject or per the Tegan. I know they try to do that in our curriculum map, but like, really give us some choices on what we can use part of the subject. And that will kind of help come up with things to do.

Participant #14 discussed the challenges with technology. Participant #14 said:

> The biggest challenge at this point is every student since the Chromebooks are one to one. At this point, it has been a big challenge where it's almost like the students have too much access to technology at this point. As I mentioned before, we have nearly every assignment that uses some kind of technology. But unfortunately, we are having to kind of figure out ways to move away from that and to come up with more pencil and paper or kinetic activities to be able to teach

> because our students have a computer in front of them. And so they will find something else to do, they'll fight, you know that they play games, they will watch videos. They will do anything but pay attention and learn. And so that has been the biggest struggle, because not only are we competing with phones, now we're competing with the Chromebook and then the other struggle that we all have is just the expectation of the students bringing it with them to school each day. And then if they don't then they, the student's excuses. Well, I don't have a Chromebook. So can't do work. And so, you know, luckily, as a special education teacher, I do have access to extra Chromebooks. And I'm even that type of teacher that say, "Oh, great!" use mine. So, and but, you know, if there are too many students that don't have their Chromebooks, that can be a challenge.

Theme 1: Tools and Benefits

The focus was on the provision of technological tools that facilitate the integration of technology into lessons for their students and teachers learn the technology and the benefits of integrating technology into their lessons. Several participants called to extra time to practice whenever they gain access to a new technology tool or program. Also, teachers expressed a strong desire to learn what technology would benefit specific learning disabilities.

Participant # 15 said:

> So, we have a lot of audio, you know, speech to text, or text to speech assistance there that are embedded into like our edge 14 system for when they're taking tests, but they have them where they can use it online, like if they're just surfing the

> web. So that's one thing that is helpful for the students that are not able to necessarily read on their own or comprehend within that is for your system. And like the content and language supports, it gives them the opportunity to look deeper into words that they may not be familiar with, or words that might not have been introduced to them at that level, or that they just don't remember, um, it gives them the definition, it helps them sound it out. So they have you know, headphones and things like that, that will not be so that they won't be able to distracting to the students around them, but they're still kind of receiving, what they need a speech to text, even students that you know, need help, kind of speaking the information back or understanding that information. I think those things are really good for our students that are not as vocal.

Participant #6 did not answer the question regarding technology and specially designed instruction for students with disabilities.

Theme 2: Professional Development

This theme was concerned with professional development that prepares teachers for technology integration. Participant # 6 did have a response however it was limited. Participant #6 said:

> Again, probably the same thing I just got through saying I don't think I could probably add to that, because it's integrated in I'm really liked the application that's available through the book. We do use that now. We don't use it all the time. But are all of our tech star based? Well, I say most of them are based through the study sync applications so that we have access to all these different diverse

> learning, you know, applications and platforms. So, I love to use the study sink but we don't always because we also teach. Like say for instance, For English three English for, we start preparing them to take the TSIA for college readiness, and because we also have college readiness at that age group, so those type things, some of it is in steady sync, but we do focus, do a more intensive focus outside of study St. But we usually will use some kind of platform or some kind of integrated online digital platform to present it to the kids. Not always, but a lot of times we try to do that. It's just easier because the availability of the text to speech and other types of accommodations are easy to not always easy, but you can plug them into the lesson, relatively easy, and you can get it online. I like the record keeping aspect of it. And I like the fact that I can store it, you know, and use it for future classes.

Participant #1 was in the content area of ELA and had more to expand the dialogue of Participant #6. Participant #1 said:

> It has been relaxed. As it relates to my district. I actually absolutely agree that our district has provided special education teachers with specifically designed instructions for blended learning. And some examples are tech tools where students have choices. They allow students choices, and what they choose and what they choose and how they can present their work. And it also is aligned to the state standards. We're working with my students who are sometimes struggling writers or readers. They have access to programs where they can speak their answer responses, and they also

have access to as an ELA teacher, they have access to graphic organizers that are actually embedded into the day's lesson.

Theme 3: Digital Shifts

Digital shift in education and the Covid-19 Pandemic propelled the use of technology for remote learning. Students and teachers were faced with virtual learning due to school closures. Educators' digital lessons were the prominent delivery of instruction.

Participant #4

> I think it's, it's a, it's very highly needed. As far as a daily process, of course, Google classroom because of COVID. I think we all thought it was a game changer to what we used to come into a traditional classroom. Now, it is it's something that the teachers out, you can always you always the students know that they can still keep up with our work because it's on Google Classroom. As far as needed, I think it's a necessity, especially for secondary and secondary education. In the world we live in today with, for example, going to banks, going different places, there's less and less people, you it's automated. You order your McDonald's; you know those, and these are things these are tools that these students need. I feel like we could never go back without it.

Participant #15

> the digital shift, so a lot of what we have kind of taken in to be able to put back out to our students, as far as the digital shift is concerned, I think is is I think it's amazing because it kind of prepares our students for what they're going to have to deal with when they enter the real world. There are a lot of jobs that, you know,

rely heavily on the technology. As far as implementing that in the classroom. That is the challenge, getting them to understand how going through the steps now and going through the learning process now will make it easier later, or give them the confidence not to, you know, to be able to navigate through those technology systems. Again, it prepares them for what they might see in the real world.

Theme 4: TPACK

Teachers use their TPACK to incorporate technology into their teaching classrooms.

Participant #3

I think the biggest thing is the focus on students doing the work. You know, we focused on students utilizing instead of, you know, when I got into education a long time ago, you know, it was the teacher who stood in front of class and taught. And then we transition into the teacher talk part of the time, and then the student work part of the time. And now we're transitioning where the teacher talks very little, and the students do all the work. And I think technology has really helped us to be able to make that transformation shift. It's made collaboration possible, especially for students who must work on things outside of school together, it's a lot easier now to do those things. And that's been a big shift for us in education, that the number of things that we can accomplish and the speed that we can accomplish them is a lot different. So, we've had to adjust to that as well.

Participant #8

Um, that's a trick question. Because I'm not a technology savvy person. So, whereas the district will give us the technology until I sit down and play with it, and play with it and play with it some more. It is a struggle. But what helps me is because I have a

pedagogical knowledge I can it helps me to tell teach an offense, the programs that I need to understand what they're doing to make sure what is it efficient for my students for what they need? And I keep in mind that I struggle with technology. So, I try to find things that are simple enough for them. But again, I can't say that the addition doesn't adequately prepare me it's just I, I guess I couldn't because I need to be more hands on. As you're doing it not like here's the steps and then you do like show me click, click click. I need you to let me do it while you're doing it, so that I can use it later because that's the only way I'm going to remember what you did even if you give me some so this year, they have with me. They've not met my special needs.

Evidence of Trustworthiness

Trustworthiness is understood as the level of confidence in data, interpretation, as well as methods utilized to ensure the quality of a given research study. It also refers to the truthfulness, authenticity, and quality of findings (Morrow, 2005). The four components correspond, respectively, to the quantitative constructs of internal validity, external validity, reliability, and objectivity. There are four specific criteria that are usually used to judge the soundness of qualitative research. They include credibility, transferability, dependability, and confirmability. This qualitative research study strengthens the validity and replicability for future research. The following sections indicate how each component of trustworthiness was addressed in this study.

Credibility

In the current study, several strategies were utilized to strengthen this criterion of trustworthiness. One of them was member checking. Member checks were utilized for

establishing credibility. After collecting data from the participants, the data were later returned the participants to them to check for accurateness as well as resonance with their experiences. Results were also returned to them to check for accuracy. All the 15 participants confirmed that the data gathered from them was accurate, hence credibility was enhanced.

Transferability

Transferability is the second major aspect of trustworthiness. It is understood as the generalizability of inquiry (Amin et al., 2020). Data is transferable to the extent that it holds true of settings and samples other than those from which it was derived (Lincoln & Guba, 1985). For this study, this criterion of trustworthiness was established through thick description of the participants. The respondents were comprised of special education teachers who teach in a particular school district in Texas. Because a small sample size was used for this research study, transferability becomes viable because the desire to create multiple studies utilizing various sample sizes, various locations, and broaden the scope of research to multiple data sources.

By collecting data from the participants through one-on-one semistructured interviews, I was able to gain an in-depth understanding of the secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. Furthermore, to assist the reader in assessing the transferability of the findings in this study to other samples and settings, descriptions of the inclusion criteria for the study sample are provided in Chapter 3, and all members of the recruited sample met those

criteria. Additionally, thick descriptions of the findings are provided in the Results section of this chapter, in the form of direct quotes from the data, so that using participants' own words, the contexts and perspectives from which they were speaking will be conveyed to the reader.

Dependability

Dependability is utilized in demonstrating or measuring the reliability and consistency of the results of the study. For this study, dependability was established such that if someone else wanted to replicate it, he/she would have adequate information from the research report to do so and obtain similar findings as the current study did. The detailed descriptions of the study procedures in Chapter 3 will enable the reader to verify the integrity of those procedures by replicating the study.

Confirmability

The final component of trustworthiness that was established in this study is confirmability. In the study, this criterion of trustworthiness was established through a detailed description of data analysis procedures, which is provided in this chapter. It highlights each step that was taken during the analysis of data to provide a justification for the decisions that were made. Specifically, six steps were followed when analyzing the data consistent with the thematic analysis process. Moreover, a member checking procedure used in this study which contributed to confirmability by allowing the participants to verify that my interpretations of the data accurately reflected their intentions in making their responses rather than any of my biases. The field test of the interview guide contributed to increasing the likelihood that the questions were free from

bias, in that they would not influence participants' responses unduly by suggesting preferred or expected answers.

Summary

This study sought to address two research questions, which have been answered adequately. Interview data from 15 secondary special education teachers from schools in a mid-size school district in Texas were analyzed through thematic analysis. Six steps of analysis were followed. The six steps are familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes, and lastly reporting. Hand coding and NVivo 12 software aided in the analysis process. The first research question was: *What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?* The findings reveal that, according to the participants, there are four key factors that influenced their instructional decisions. These include their school district providing them with technological tools that facilitate the integration into lessons for their children and that their school district provides them with the necessary professional development that prepare them for the integration. Other notable factors include the digital shift in education and the COVID-19 pandemic, as well as the potential benefits of integrating technology into their lessons.

The second research question was: *How do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?* The answer is that these teachers learn the technology and practice using it to increase their technological knowledge which was combined with

the use their technological pedagogical content knowledge to incorporate technology into their teaching lessons, which was the fourth theme. Chapter 5 will contain the research summary, implications, conclusions, and recommendations of the whole study based on these findings.

Chapter 5: Discussion, Conclusions, and Recommendations

There has been a momentous change in instructional platforms over the past several years. In the 2020s, the blending of pedagogical and technological skills has become an expectation in educational environments across the United States (Paul & Jefferson, 2019). The problem addressed in this basic qualitative study was secondary special education teachers' descriptions of technology integration regarding their subject-content expertise and the factors that affect their technology integration decisions. Schools aim to close the gap between teachers' and students' grasp of today's educational technologies that continue to grow extremely fast. Additionally, the views of secondary educators regarding technology integration differ as regards the implementation of technology and influence the success of the integration process (Akram et al., 2022). For some instructors, the change process can be difficult, hence their professional development needs will vary, particularly in special education (Darling-Hammond et al., 2019). In this basic qualitative study, I focused on technology integration through the lens of the TPACK framework. This was a suitable framework as its components address the complexity of technology integration, students and teachers learning through technology, and content. This study sought to investigate secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions.

I aimed to answer two RQs. The first RQ was as follows: *What factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?* Four themes emerged

from the data that helped to address this research question. These are: (a) provision of technological tools that facilitate the integration of technology into lessons for their students, (b) professional development that prepare teachers for the integration, (c) digital shift in education, the COVID-19 pandemic, and the benefits of integrating technology into their lessons, and (d) teachers use their TPACK and practice technology to increase their technological knowledge. The second research question was: *How do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?* Two themes emerged from the data that helped to answer this research question. These were: (a) teachers learn the technology and practice using it to increase their technological knowledge, and (b) teachers use their technological pedagogical content knowledge to incorporate technology into their teaching classrooms. Five major sections are covered in this chapter, namely interpretation of the findings, limitations of the study, recommendations, implications, and the conclusion of the study.

Interpretation of the Findings

The purpose of this section is to provide an interpretation of the relationship between the findings in this study and the conceptual and empirical literature. Based on the results of this study as described in Chapter 4, four themes were identified. This section is organized by theme.

Theme 1: Provision of Technological Tools that Facilitate the Integration of Technology into Lessons for their Students and Teachers Learn the Technology and the Benefits of Integrating Technology into their Lessons

Data supporting this theme was drawn from all 15 individual interviews. This theme helps to address RQ1. The finding indicated that according to the participants, one factor that influenced their instructional decisions to integrate technology into lessons for their students was that their school district provided the necessary technological tools and resources that enabled them to integrate technology into lessons. Participant 1 spoke about how their school district provides them with the technological resources and tools stating, “And our district provides us with all the tools and resources that we need to help make us stronger in our classrooms.” This participant added that, “The technology that we use is provided by our district…we use a lot of Google Classroom, and a lot of other apps such as Snowflake, which is an interactive activity that students can do on a panel.”

Participant 10 indicated that the school district bought them the licenses for various online tools and resources, noting that, “the district has bought, or I guess would be bought, the licensing to different online learning management systems for the students in the classroom and teachers to use during instruction and for assessments.” Participant 3 stated that, “they have given us more resources. They've really pushed through their initiatives and things like that for us to utilize technology in the classroom.” Participant 4 noted that, “They provided at my particular campus, every classroom with Chromebooks.” Similarly, Participant 9 reported that, “And they supplied us all with Chromebooks of our own to be able to, you know, help with the students and they've

supplied the classroom with charging towers. It helps to give us a place to charge Chromebooks."

Participant 13 reported that "I think the district has made the changes necessary by providing more resources. So as increasingly [technological resources and tools] is becoming available the district is that they are buying the programs that are necessary, they are they are figuring out ways to use it and they are giving that to the teachers the best way they can." Additionally, participant 13 also shared that "And then we also use a program called CommonLit a lot since I am an English teacher. That is one of our approved resources that we have for the classroom is CommonLit."

The Benefits Of Integrating Technology Into Their Lessons

Data support was drawn from all 15 individual interviews. This helps to answer RQ1. The finding demonstrated that according to the participants, the other factor that influenced their instructional decisions to integrate technology into lessons for their students included the benefits of integrating technology into their lessons. Speaking about technology integration at the secondary education level, Participant 1 replied that:

> As it relates to my campus, I believe that it has been beneficial. As I teach a special population that has really been a benefit to my students as well as the curriculum. I came to education during the beginning of the pandemic and saw it was crucial that we have the tech tools needed to continue taking instruction.

This participant added that, "I choose to use it because it is more hands on for my students. I have diverse types of learners and it helps me to differentiate, differentiate my lessons to reach to reach of all of my students." Likewise, Participant 14 talked about

how important it is in providing differentiated instruction, stating:

> Especially for differentiated instruction that we have been, we have been taught how to use different tools and how to implement them for blended learning. And yeah, and especially to help our Gen Ed teachers differentiate those lessons.

Participant 2 noted that, "With being able to have language and content support, or having spelling assistance versus our online dictionaries, I really think that it's more beneficial for them to have it available to them now." Moreover, the participants talked about how the technology aids them in their classroom instruction, sharing that:

> I currently use the computer panel, specifically the note software that comes along with it. And I use that because I can write on the board. I can use different math manipulatives or divergent backgrounds to aid in my instruction during the math classroom. Yes, the Google slideshow, mainly because of the animations that I can put into the teaching so that the students will get the visual for any concept that I am teaching them at the moment.

Additionally, the participants indicated that technology integration is beneficial as the technology provides learners with spelling assistance. Participant 13 commented that, "I just think that the technology helps implement other accommodations as well like spelling assistance…they [learners] are much more willing to, to use an online dictionary as opposed to a hardcopy dictionary." Participant 1 stated:

> They [tech tools] allow students choices, and what they choose and how they can present their work. And it also is aligned to the state standards. We're working with my students who are sometimes struggling writers or readers. They have

access to programs where they can actually speak their answer responses. Additionally, Participant 3 talked about the use of "Chromebooks to help the kids with the spelling assistance and readings, the text to speech and some of that stuff." The results from this study confirmed Mishra and Mehta's (2017) that special education teachers must learn the technology tools and the benefits of technology integration to be confident with 21st-century learning.

Theme 2: Professional Development That Prepare Teachers for Integration

Data supporting this theme was drawn from 12 individual interviews. This theme helps to answer RQ1. The finding showed that the secondary special education teachers described training and professional development (PD) that prepare teachers for the integration as another factor that influenced their instructional decisions to integrate technology into lessons for their students. Participant 1 stated that the school district provides them with the necessary training noting that, "So my district, I pride them on that they make sure that we are prepared by providing the necessary training that we need to help integrate our lessons into our classroom." Participant 4 shared that, "each year at the beginning of the year, our school district, they host a variety of classes and courses and they show you new tools and ways to help teach things that you use, thought, well, well never thought of that, you know, [I] went to these classes and [learned] things that I probably would have not known." In addition, Participant 5 also talked about training sharing, "I'm basically training and more training, and assisting with writing the lesson plans and assisting with how to incorporate technology in because that's the big thing, not being comfortable with it and not knowing how to use it. The training that we receive on

how to use it, how to incorporate it, and how it's beneficial."

Other study participants shared the same experience. Participant 9 expressed, "we've had quite a bit of staff development on new technology and apps. Like last year I learned about Quill, I didn't know anything about quill.org until I went to our staff development, our district staff development." This participant added that, "So I was able to use Quill, which is an awesome site for students to practice." Participant 14 indicated that, "I think the district has made the changes necessary by providing more training and professional development with technology…they are helping us figure out ways to do that successfully and appropriately within the classroom." Lastly, Participant 15 noted that:

> We have curved professional development on a lot of those [technological tools], like I said, a lot of those platforms that have been introduced or repurchased. For example, Stem Scopes, we have a lot of trainings on that we had an initial training that lasted all day long…Um, I think that there were some other trainings throughout the years professional development that allowed us to be able to pick and choose what we wanted to use and how we wanted to integrate that into the classroom. After we figured out how to like, navigate to the website, because it is a lot of information there. So, I think the district does a good job of giving us those trainings, or those training opportunities.

The results from this study help confirm what Lai et al. (2022) found that when teachers gain a better understanding of technology usage, technology integration improves in the classroom.

Theme 3: Digital Shift in Education and the Covid-19 Pandemic

Data to support this theme were drawn from 11 out the 15 individual interviews. This theme helps to address RQ1. The finding revealed that according to the participants, the digital shift in education and the Covid-19 pandemic was another factor that influenced their instructional decisions to integrate technology into lessons for their students. When talking about technology integration at the secondary education level, Participant 7 mentioned that "I can say post COVID that it has stepped up 100%. Like it has been more that we have to use it because everything had to be, you know, technology based to reach the students during COVID." When asked to describe technology integration at the secondary level, Participant 12 stated that, "There is no better description than when the pandemic became a reality. And we had to utilize technology to teach our students." Participant 15 spoke about how Covid-19 pandemic increased the pace of technology integration, noting:

> It happened with COVID, where there was kind of a surge of it. We did have technology integrated, but it wasn't so widely relied upon until COVID. I mean, I think that made it a little bit more difficult. We were able to kind of grow with technology as it, you know, developed in our district, but I think COVID brought it on monsoon of technology.

Participant 1 elaborated about the significance of the digital shift in education and how it impacted on his technology's integration and his capacity to teach special education students, saying:

> And the 21st century is central, as we witness from the recent pandemic, all the

> districts are just completely shut down. It allowed us the opportunity, once we got back up and running, to be able to reach our students on a virtual level, have that not been possible that our students would have been really, really far behind in their growth. So, I believe that it was really a major asset. And as we move forward and technology, we are something that will never become obsolete. It's the way that we're going in the 21st century.

Speaking about the digital shift, Participant 12 stated that, “It’s a positive. There's no going back, especially after the pandemic…I think it's a positive, especially with our special needs community, they can access their assignments at any time they can review it anytime.” Similarly, Participant 13 indicated that, “I do think it is extremely necessary for us to adapt and be able to use that technology and have the students used to using that technology as well, because that's the world that they're living in.” Furthermore, Participant 2 mentioned that “I honestly believe that with a digital shift is just a way of that's just the way of evolution right now everything is readily available at your fingertips. I genuinely believe that. It helps not hinders our special education students.” Lastly, Participant 3 mentioned that:

> I think it's good that we were kind of shifting towards more digital resources because the world itself is shifting to digital resources. And ultimately, our job is to prepare students to strive and succeed in the in the in the world. You know, I think that, you know, as that happens, the older generation, which I'm slowly becoming a part of, need to keep up with the modern stuff. So, it's good for us to stay up to date on new technologies and the things that you know, the world is

going to.

This study extended the knowledge of Galvin & Greenhow's (2019) study regarding the necessity for technology integration in the 21st century classroom. Social media platforms supporting authentic communication are prevalent in the 21st-century era. The delivery method of educational instruction must be flexible to shift whether face-to-face or digital.

Theme 4: Teachers Use Their TPACK to Incorporate Technology into Their Teaching Classrooms

Eight interview participants contributed to this theme. This theme helps to address RQ2. This theme shows that secondary special education teachers use their technological pedagogical content knowledge to incorporate technology into their teaching classrooms. Participant 1 stated that:

> I work with a lot of emergent learners. A lot of my learners are emergent based on the demographics of where we are. So, it has allowed me as an ELA teacher to better structure my lessons and incorporate technology into those lessons to help my EB learners achieve success.

Likewise, Participant 10 mentioned that she had, "to incorporate the online or technological sources resources in the classroom." Participant 13 indicated that:

> So the main thing I've done and mine is I have tried to, since I do teach English, I do still want students able to, you know, to that, to do that free thinking, the free response, you know, so be used to using more traditional methods, pen and paper, I still like to, I still like to provide a hard copy of the text, things like that. But within that, we still implement a digital version. So that way they are used to the,

> you know, the way that the state and standards are expecting them to respond and to access materials.

According to Participant 9, “Now we have to make sure that we have lessons that students can interact with online. So, you got to make sure that you've put it in some type of format that students can edit.” Discussing about how she incorporates technology, Participant 7 stated that:

> I have like so, you know, just for example, if I take, if I'm teaching, and prints, you know, it's actually something that I happen to be teaching, then I do and introduce it with more like, with my attention grabbers with like a video and things like that. And I use it a lot for small groups, I use technology a lot for the small groups, because it's able to, I'm able to differentiate it more.

Therefore, the results from this study uphold Xie et al. (2021) found that the more experience and TPACK teachers had, increased their capability of incorporating technology integration in classroom lessons.

Limitations of the Study

Several limitations to trustworthiness arose from the execution of this study. First, the views and experiences of the participants interviewed may or may not have reflected the views and experiences of special education teachers with similar characteristics. Second, the findings might be limited to the behaviors, beliefs, experiences, and activities of the individuals, group, and organization presented in this study. The third limitation pertains to the design of the study. In this basic qualitative study, another notable limitation was how to measure the effectiveness of the technology integration and

implementation. This limitation was beyond the control of the researcher. Thus, the collection of data was limited to the number of participants' responses during the semistructured interviews. Therefore, the results from the sample size could not be generalized to a larger population in the education field. Additionally, the perception, teaching, and learning experiences of the teachers may not be generalized to the education and teaching environment. Therefore, similar findings may or may not be found in further research.

The fourth limitation is that because the setting for this final study was a mid-size school district in Texas, the findings might not be transferable to a smaller school district or a large urban school district outside of Texas. Readers will have the discretion to determine what findings will apply to the study. Thus, some people might be able to use these findings if they find relatable data in their specific setting.

Recommendations

Several recommendations are made for future research on the topic. The current research study enlisted secondary special education teachers as participants from only one school district in Texas. Therefore, future research on the topic of this study should use participants from multiple school districts, preferably from different states. Additionally, the current study used only a single data source, which comprised semistructured interviews. Therefore, another recommendation for future research is that multiple data sources should be used to triangulate data. Future researchers on the topic of this study may triangulate research data by gathering data not only using

semistructured interviews, but also using focus groups, document review, or even qualitative questionnaires.

The current study used a purposeful sampling technique. It shed light on secondary special education teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions. However, little is known about the elementary special education teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise as well as the factors affecting their technology integration decisions. Another recommendation, therefore, is that future studies on the subject may focus on elementary special education teachers as they also expected to integrate technology into classroom teaching and learning thanks to the digital shift in the current 21st century (Andrade-Vargas et al., 2021). Researchers may also utilize different sampling strategies, for instance quota sampling. Furthermore, it is recommended that future studies should use different research designs or even a different research methodology. The current study adopted the basic qualitative approach and future studies may use a quantitative methodology. This would help to increase the accuracy and objectivity of the results since numerical data would be collected. Future studies may also utilize a different qualitative research design apart from the basic qualitative design that was used in this study. For instance, a case study design may be utilized.

Implications

This study helped close the gap between Mishra and Koehler (2006) found as TPACK and technology integration in the secondary education classroom. The study confirmed the themes of professional development, technology tools and practice are what teachers perceive as effective ways to promote positive technology integration with classroom instruction and increase technological knowledge.

Potential Impact for Positive Social Change

The findings of this study may have a potential impact for positive social change at the societal level. Specifically, this study may benefit society by informing the work of many secondary special education educators regarding technological pedagogical content knowledge and technology integration, thereby promoting positive social change in the professional learning community. Moreover, this study may positively impact social change through gaining a better understanding of ways to assist secondary special education and general education teachers with technology integration and prepare students using 21st century skills that will enable them to compete and succeed academically.

Methodological, Conceptual Implications

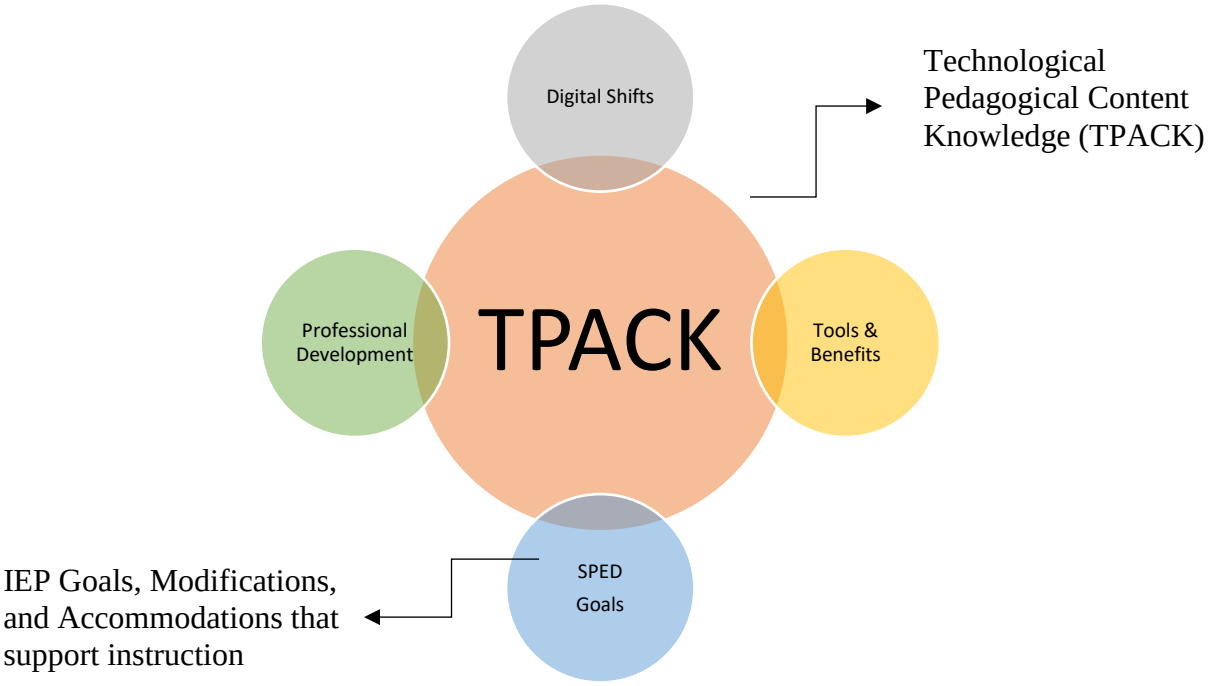
This study may have significant conceptual implications. The theory that was used in this study was the TPACK framework, which has several components such as content knowledge, pedagogical knowledge, and technology knowledge. This study extends this framework by showing how it is applicable to the integration of technology by special education secondary school teachers. The finding that secondary education

educators utilize their technological pedagogical content knowledge to incorporate technology into their teaching classrooms is in line with TK, which is the instructor's knowledge about new and traditional technologies that can be integrated into curriculum.

Special education technology integration for classroom instruction encompasses a comprehensive framework consisting of five crucial components. At the core of this framework, as illustrated in Figure 2, lies the focal point known as Technological Pedagogical Content Knowledge (TPACK). This component serves as the foundation upon which the other four supporting elements are built, thus establishing a cohesive system.

Figure 2

Special Education TPACK Framework



Note. Special Education Technology Integration Image Carla Windfont, 2024

The first supporting component is professional development. This facet recognizes the significance of continuous training and specialized guidance for educators to effectively integrate special education technology into their instructional practices. Through ongoing professional development opportunities, teachers acquire the necessary knowledge and skills to navigate and utilize various technological tools that cater specifically to students with special needs.

Another key element within this framework is SPED goals. These objectives align closely with individualized education plans (IEPs) and address the unique learning requirements of students receiving special education services. By incorporating technology into classroom instruction, educators can create personalized learning experiences that directly support these SPED goals, enabling students to make optimal progress in their academic goals.

Tools and benefits serve as an additional integral component of special education technology integration. This aspect emphasizes the diverse range of technological resources available to enhance teaching and learning experiences for students with disabilities. From assistive technologies such as text-to-speech software or adaptive devices to educational apps for specially designed instruction (SDI), educators have access to an array of tools that promote accessibility, engagement, and inclusivity within the classroom setting. Teachers learn the benefits of integrating technology into their lessons.

The final supporting component in this framework is digital shifts. As technology continues to evolve rapidly, it brings about transformative changes in educational

practices. The concept of digital shifts refers to the fundamental paradigm shift occurring in classrooms where traditional methods are supplanted by innovative approaches enabled by technology. COVID and Pandemic increased the need to increase technology integration. Special education technology integration embraces these digital shifts, fostering an environment where teachers harness technology not merely as an add-on but rather as an essential tool for facilitating effective instruction tailored to meet the needs of all learners.

In conclusion, special education technology integration for classroom instruction encompasses a comprehensive framework comprising five key components. These include professional development, SPED goals, tools and benefits, and digital shifts, all revolving around the central focus of TPACK. Teachers use their TPACK to incorporate technology into their classrooms. Teachers learn the technology and practice using it to increase their technological knowledge. By understanding and implementing this framework, educators can unlock the potential of technology to create inclusive and impactful learning experiences for students with special needs.

Recommendations for Practice

A few recommendations for practice are made based on the findings of this study. First, it is recommended that appropriate special education secondary teachers be provided with the necessary technology training and professional development. The recommendation is made because of the training these teachers need that would enable them to effectively integrate technology into their classroom teaching and instruction. Marie (2021) pointed out that secondary school general education teachers support

technology integration for classroom instruction when they are trained. In addition, a lack of training could be a barrier to successful technology integration. Akram et al. (2022) stated that when special education teachers have not had the training necessary for each online platform supported by the district, the teachers may lack the content knowledge and skills of how to readily support students in the classroom environment. Thus, it is imperative that they are provided with the necessary training and professional development on technology integration.

My second recommendation for practice is special education secondary teachers and students be provided with the necessary resources and technology tools. Doing so will ensure that they are well prepared to integrate technology into their classroom lessons. For example, secondary special education teachers need to be provided with education technology (EdTech) tools such as Chromebooks, Google Classroom and EdPuzzle among others depending on their needs and goals.

Conclusion

Local districts throughout the United States are constantly trying to find best practices that educators may utilize to strengthen low-performing special education students' educational levels and close the achievement gap. School districts target much of their funds to improve technology for the general education population. Nonetheless, special education students' technology differs from that of the general education program needs. The purpose of this basic qualitative study was to investigate secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions.

It sought to answer two research questions. These were: (1) *what factors do secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students?* and (2) *how do secondary special education teachers describe their technological pedagogical content knowledge as it applies to their teaching lessons to their students?* The TPACK Framework was used as conceptual framework. The findings of this study have adequately answered all the research questions.

For RQ1, the findings revealed that the factors that secondary special education teachers describe as influencing their instructional decisions to integrate technology into lessons for their students include provision of technological tools and that facilitate the integration of technology into lessons for their students and the benefits of technology practice which the first theme, and professional development that prepare the teachers for the integration which was the second theme. Others are the digital shift in education and the COVI D-19 pandemic, which was the third theme, which was the fourth theme. For RQ2, the findings showed that the teachers learn the technology and they use their technological pedagogical content knowledge to incorporate technology into their teaching lessons, which emerged as the fourth theme.

All these findings are consistent with the expectations from literature and the conceptual framework. The implications for practice are that necessary technology tools and resources should be provided to secondary school teachers to facilitate their technology integration. Moreover, the teachers should be provided with the relevant

technological training to enable them to better integrate technology into classroom lessons to more effectively facilitate learning for all students.

References

Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers? *Professional Development in Education*, *47*(4), 684–698. https://doi.org/10.1080/19415257.2019.1665573

Adnan, W. I. W., Wahid, N. A., Majid, N. A., Jaafar, F. W., & Ismail, N. A. (2020). Technology integration in implementing a curriculum: Teachers' beliefs and willingness to change. *Journal of Physics: Conference Series*, *1529*(5), 052081. https://dx.doi.org/10.1088/1742-6596/1529/5/052081

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning Practices: A systematic review. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.920317

Álvarez, B. (2021, March 12). *Promising Changes for Special Education Under ESSA | NEA*. https://www.nea.org/advocating-for-change/new-from-nea/promising-changes-special-education-under-essa

Anabo, I., Elexpuru-Albizuri, I., & Villardón-Gallego, L. (2019). Revisiting the Belmont Report's ethical principles in internet-mediated research: Perspectives from disciplinary associations in the social sciences. *Ethics & Information Technology*, *21*(2), 137–149. https://doi.org/10.1007/s10676-018-9495-z

Anderson, J., & Rainie, L. (2021). *The Future of Digital Spaces and Their Role in Democracy*. https://search.issuelab.org/resource/the-future-of-digital-spaces-and-their-role-in-democracy.html

Andrade-Vargas, L., Estevao-Romeiro, A., Iriarte-Solano, M., Riofrio-Leiva, V., & Yunga-Godoy, D. (2021). Teacher's perceptions, institutional challenges, and educational sustainability during Covid-19 in Ecuador. *Heliyon, 7*(12). https://doi.org/10.1016/j.heliyon.2021.e08596

Andyani, H., Setyosari, P., Wiyono, B. B., & Djatmika, E. T. (2020). Does Technological Pedagogical Content Knowledge Impact on the Use of ICT in Pedagogy? *International Journal of Emerging Technologies in Learning*, *15*(3), 126–139. https://doi.org/10.3991/ijet.v15i03.11690

Bainbridge, K., Shute, V., Rahimi, S., Liu, Z., Slater, S., Baker, R. S., & D'Mello, S. K. (2022). Does embedding learning supports enhance transfer during game-based learning? *Learning and Instruction*, *77*. https://doi.org/10.1016/j.learninstruc.2021.101547

Baturay, M. H., Gökçearslan, Ş., & Ke, F. (2017). The relationship among pre-service teachers' computer competence, attitude towards computer-assisted education, and intention of technology acceptance. *International Journal of Technology Enhanced Learning*, *9*(1), 1–13. https://doi.org/ 10.1504/IJTEL.2017.10003119

Bazen, A., Barg, F. K., & Takeshita, J. (2021). Research Techniques Made Simple: An Introduction to Qualitative Research. *Journal of Investigative Dermatology*, *141*(2), 241–247. https://doi.org/10.1016/j.jid.2020.11.029

Bice, H., & Tang, H. (2022). Teachers' beliefs and practices of Technology Integration at a school for students with dyslexia: A mixed methods study. *Education and Information Technologies*. https://doi.org/10.1007/s10639-022-11044-1

Billingsley, B., Bettini, E., Mathews, H. M., & McLeskey, J. (2020). Improving working conditions to support special educators' effectiveness: A call for leadership. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *43*(1), 7–27. https://doi.org/10.1177/0888406419880353

Bouchard, J. (2018). Pedagogical Content Knowledge. *Pedagogical Content Knowledge - - Research Starters Education*, 1–1.

Bouchard, J. (2019). Pedagogical Content Knowledge. In *Salem Press Encyclopedia*. Great Neck Publishing.

Bouchard, J. (2021). Pedagogical Content Knowledge. In *Salem Press Encyclopedia*. Great Neck Publishing.

Bowman, M. A., Vongkulluksn, V. W., Jiang, Z., & Xie, K. (2020). Teachers' exposure to professional development and the quality of their instructional technology use: The mediating role of teachers' value and ability beliefs. . . *Journal of Research on Technology in Education*, *54*(2), 188–204. https://doi.org/10.1080/15391523.2020.1830895

Braun, V., & Clarke, V. (2006a). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2006b). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), Article 2. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2006c). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77. https://doi.org/10.1191/1478088706qp063oa

Buckley, J., Adams, L., Aribilola, I., Arshad, I., Azeem, M., Bracken, L., Breheny, C., Buckley, C., Chimello, I., Fagan, A., Fitzpatrick, D. P., Garza Herrera, D., Gomes, G. D., Grassick, S., Halligan, E., Hirway, A., Hyland, T., Imtiaz, M. B., Khan, M. B., & Lanzagorta Garcia, E. (2022). An assessment of the transparency of contemporary technology education research employing interview-based methodologies. *International Journal of Technology & Design Education*, *32*(4), 1963–1982. https://doi.org/10.1007/s10798-021-09695-1

Burkholder, G. J., Cox, K., Crawford, L., & Hitchcock, J. H. (2020). *Research Design and Methods: An Applied Guide for the Scholar-Practitioner*. Sage Publications, Inc.

Cabero-Almenara, J., Romero-Tena, R., & Palacios-Rodríguez, A. (2020). Evaluation of Teacher Digital Competence Frameworks Through Expert Judgement: The Use of the Expert Competence Coefficient. *Journal of New Approaches in Educational Research (NAER Journal)*, *9*(2), 275–293. https://doi.org/10.7821/naer.2020.7.578

Cagiltay, K., Cakir, H., Karasu, N., Karasu, N., Islim, O. F., & Cicek, F. (2019). Use of Educational Technology in Special Education: Perceptions of Teachers. *Participatory Educational Research*, *6*(2), 189–205. https://doi.org/10.17275/per.19.21.6.2

Campbell, M. P., & Lee, H.-S. (2017). Examining secondary mathematics teachers' opportunities to develop mathematically in professional learning communities. *School Science and Mathematics*, *117*(3–4), 115–126. https://doi.org/10.1111/ssm.12209

Cárdenas, J., & Inga, E. (2021). Methodological Experience in the Teaching-Learning of the English Language for Students with Visual Impairment. *Education Sciences*, *11*. https://doi.org/10.3390/educsci11090515

Carl, N. M., & Ravitch, S. M. (2018). *Interviews* (p. 877).

Chao, C., & Liu, Q. (2022). Revisiting CALL normalization through a Yin–Yang ecological perspective: A study on teacher intentionality and classroom technology use of a claimed reluctant user. *System*, *108*, 102830. https://doi.org/10.1016/j.system.2022.102830

Chen, H.-J., Liao, L.-L., Chang, Y.-C., & Chang, L.-C. (2019). Factors influencing technology integration in the curriculum for Taiwanese Health Profession Educators: A mixed-methods study. *International Journal of Environmental Research and Public Health*, *16*(14), 2602.

Cheng, S.-L., Lu, L., Xie, K., & Vongkulluksn, V. W. (2020). Understanding teacher technology integration from expectancy-value perspectives. *Teaching and Teacher Education*, *91*, 103062. https://doi.org/10.1016/j.tate.2020.103062

Cheng, S.-L., & Xie, K. (2018). The relations among teacher value beliefs, personal characteristics, and TPACK in intervention and non-intervention settings.

Teaching and Teacher Education, *74*, 98–113. https://doi.org/10.1016/j.tate.2018.04.014

Cherewka, A. (2020, September 3). *The Digital Divide Hits U.S. Immigrant Households Disproportionately during the COVID-19 Pandemic | Immigration Research Library*. https://www.immigrationresearch.org/the-digital-divide-hits-us-immigrant-households-disproportionately-during-the-covid-19-pandemic

Cohen, J., Ruzek, E., & Sandilos, L. (2018). Does teaching quality cross subjects? Exploring consistency in elementary teacher practice across subjects. *AERA Open*, *4*(3). https://doi.org/10.1177/233285841879449

Creswell, J. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (third). Sage Publications, Inc.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Pearson Education, Inc.

Creswell, J. W. (2013). *Qualitative Inquiry & Research Design choosing among five approaches*. SAGE Publications, Inc.

Dikmen, C. H., & Demirer, V. (2022). The Role of Technological Pedagogical Content Knowledge and Social Cognitive Variables in Teachers' Technology Integration Behaviors. *Participatory Educational Research*, *9*(2), 398–415. https://doi.org/10.17275/per.22.46.9.2

Dogan, N. A., Dawson, K., & Ritzhaupt, A. D. (2021). Do School Levels Matter? How Elementary, Middle, and High School Teachers Differ in Their Perceptions and

Use of Technology. *Journal of Educational Technology Systems*, *49*(4), 432–460. https://doi.org/10.1177/0047239520961339

Dumitrica, D., & Jarmula, P. (2022). Teaching Qualitative Research Methods in Media and Communication: The Benefits and Limitations of Digital Learning Objects. *Qualitative Report*, *27*(9), 1934–1951. https://doi.org/10.46743/2160-3715/2022.5256

Durff, L., & Carter, M. (2019). Overcoming Second-Order Barriers to Technology Integration in K–5 Schools. *Journal of Educational Research and Practice*. https://doi.org/10.5590/JERAP.2019.09.1.18

Eickelmann, B., & Vennemann, M. (2017). Teachers‘ attitudes and beliefs regarding ICT in teaching and learning in European countries. *European Educational Research Journal*, *16*(6), 733–761. https://doi.org/10.1177/1474904117725899

Eiland, L. S., & Todd, T. J. (2019). Considerations When Incorporating Technology into Classroom and Experiential Teaching. *The Journal of Pediatric Pharmacology and Therapeutics : JPPT*, *24*(4), 270. https://doi.org/10.5863/1551-6776-24.4.270

Emery, C., Dawes, L., & Raffo, C. (2022). The Local Matters: Working with Teachers to Rethink the Poverty and Achievement Gap Discourse: *Educational Policy Analysis Archives.*, *30*(122). https://doi.org/10.14507/epaa.30.6870

Er, E., & Kim, C. (2017). Episode-centered guidelines for teacher belief change toward technology integration. *Educational Technology Research & Development*, *65*(4), 1041–1065. https://doi.org/10.1007/s11423-017-9518-1

Ertmer, P. A. (1999). *Addressing first- and second-order barriers to change: Strategies for technology integration | SpringerLink*. Educational Technology Research Nd Developmemt. https://doi.org/10.1007/BF0229959

Evens, M., Elen, J., Larmuseau, C., & Depaepe, F. (2018). Promoting the development of teacher professional knowledge: Integrating content and pedagogy in teacher education. *Teaching and Teacher Education*, *75*, 244–258. https://doi.org/10.1016/j.tate.2018.07.001

Falloon, G. (2020). From Digital Literacy to digital competence: The teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

Fernandez-Batanero, J. M., P, R.-G., Mm, R.-R., & M, M.-R. (2021). Impact of Educational Technology on Teacher Stress and Anxiety: A Literature Review. *International Journal of Environmental Research and Public Health*, *18*(2). https://doi.org/10.3390/ijerph18020548

Francisco, M. P. B., Hartman, M., & Wang, Y. (2020). Inclusion and Special Education. *Education Sciences*, *10*. https://doi.org/10.3390/educsci10090238

Gale, F., Edenborough, M. A., Boccanfuso, E., Hawkins, M., Thomson, R. J., & Sell, C. (2021). *Promoting Intercultural Understanding, Connectedness, and Belonging: An Independent Evaluation of Together for Humanity Programs*. https://doi.org/10.26183/5e44b23990048

Galvin, S., & Greenhow, C. (2019). Writing on social media: Review of the research in the high school classroom. *TechTrends, 64*, 57–69. https://doi.org/10.1007/s11528-019-00428-9

Gao, S., Damico, N., & Gelfuso, A. (2021). Mapping and reflecting on integration of the components of pedagogical content knowledge (PCK) for teaching natural selection: A case study of an experienced middle-school science teacher. *Teaching and Teacher Education, 107*. https://doi.org/10.1016/j.tate.2021.103473

Glesne, C. (2011). *Becoming a Qualitative Researcher: An Introduction* (3rd ed.). Pearson Education.

Gomez, F. C., Trespalacios, J., Hsu, Y.-C., & Yang, D. (2021). Exploring teachers' technology integration self-efficacy through the 2017 ISTE standards. *TechTrends*, *66*(2), 159–171. https://doi.org/10.1007/s11528-021-00639-z

Green, A. L., McKenzie, J., Lewis, T. J., & Poch, A. L. (2021). From NCLB to ESSA: Implications for Teacher Preparation and Policy. *Journal of Disability Policy Studies*, *32*(3), 204–211. https://doi.org/10.1177/1044207320945397

Hancock, D. R., Algozzine, R., & Lim, J. H. (2021). Doing case study research: A practical guide for beginning researchers. *Teachers College Press*.

Hartman, R. J., Townsend, M. B., & Jackson, M. (2019). Educators' perceptions of technology integration into the classroom: A descriptive case study. *Journal of Research in Innovative Teaching & Learning*, *12*(3), 236–249. https://doi.org/10.1108/JRIT-03-2019-0044

Hayes, A. M., Dombrowski, E., Shefcyk, A. H., & Bulat, J. (2018). *Learning disabilities screening and evaluation guide for low- and middle-income countries*. https://doi.org/10.3768/rtipress.2018.op.0052.1804

Hennessy, S., D'Angelo, S., McIntyre, N., Koomar, S., Kreimeia, A., Cao, L., Brugha, M., & Zubairi, A. (2022). Technology Use for Teacher Professional Development in Low- and Middle-Income Countries: A systematic review. *Computers and Education Open*, *3*, 100080. https://doi.org/10.1016/j.caeo.2022.100080

Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, *292*. https://doi.org/10.1016/j.socscimed.2021.114523

Hill, J. E., & Uribe-Florez, L. (2020). Understanding Secondary School Teachers' TPACK and Technology Implementation in Mathematics Classrooms. *International Journal of Technology in Education*, *3*(1), 1–13. https://doi.org/10.46328/ijte.v3i1.8

Hong, J.-C., Liu, Y., & Zhao, L. (2021). High school students' online learning ineffectiveness in experimental courses during the COVID-19 pandemic. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.738695

Hughes, J., Thomas, R., & Scharber, C. (2006). *Assessing Technology Integration: The RAT – Replacement, Amplification, and Transformation - Framework*. 1616–1620. https://www.learntechlib.org/primary/p/22293/

Hutchinson, A. C., & Woodward, L. (2018). Examining the technology integration planning cycle model of professional development to support teachers'

instructional practices. *TEACHERS COLLEGE RECORD*, *120*. https://doi.org/10.1177/016146811812001002

Huyler, D., & McGill, C. M. (2019). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, by John Creswell and J. David Creswell. Thousand Oaks, CA: Sage Publication, Inc. *New Horizons in Adult Education & Human Resource Development*, *31*(3), 75–77. https://doi.org/10.1002/nha3.20258

Individuals With Disabilities Education Act, Pub. L. No. 1400, 20 U.S.C. (2004).

Jaipal Jamani, K., & Figg, C. (2013). The TPACK-in-Practice Workshop Approach: A Shift from Learning the Tool to Learning About Technology-Enhanced Teaching. *Proceedings of the 8th International Conference on E-Learning*, 215–223.

Jandrić, P., Hayes, D., Levinson, P., Christensen, L. L., Lukoko, H. O., Kihwele, J. E., Brown, J. B., Reitz, C., Mozelius, P., Nejad, H. G., Martinez, A. F., Arantes, J. A., Jackson, L., Gustafsson, U., Abegglen, S., Burns, T., Sinfield, S., Hogan, M., Kishore, P., … Hayes, S. (2021). Teaching in the Age of Covid-19—1 Year Later. *Postdigital Science and Education*, *3*(3), 1073–1223. https://doi.org/10.1007/s42438-021-00243-7

Janschitz, G., & Penker, M. (2022). How digital are "digital natives" actually? Developing an instrument to measure the degree of digitalisation of university students – the DDS-Index. *BMS: Bulletin de Methodologie Sociologique (Sage Publications Ltd.)*, *153*(1), 127–159. https://doi.org/10.1177/07591063211061760

Jennings, J. (2018, September 1). It's time to redefine the federal role in K-12 education: The U.S. Congress passed the Every Student Succeeds Act in 2015, but it's not

too soon to begin drafting a new federal education law. *Phi Delta Kappan*, *100*(1), 8. https://doi.org/10.1016/j.compedu.2010.05.022

Jimoyiannis, A. (2010). *Computers and Education*, *55*(3), 1259. https://doi.org/10.1016/j.compedu.2010.05.022

Joo, Y. J., Park, S., & Lim, E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Journal of Educational Technology & Society*, *21*(3), 48–59.

Kaoun, T. M. (2019). Sinek's Start with Why—Starts the Conversation, Raises Questions in Practice. *Journal of Leadership, Accountability & Ethics*, *16*(5), 76–80. https://doi.org/10.33423/jlae.v16i5.2656

Karunanayaka, S. P., & Weerakoon, W. M. S. (2020). Fostering Digital Education among Teachers and Learners in Sri Lankan Schools. *Journal of Learning for Development*, *7*(1), 61–77. https://doi.org/10.56059/jl4d.v7i1.390

Keol Lim, Yujin Kim, Minyoung Kim, Yoonho Jang, & Min-Ho Joo. (2019). The Digital Divide? Analyzing Regional Differences of Tablet PC Use in Korean Middle Schools for Sustainable Development. *Sustainability*, *11*(18), 5054–5054. https://doi.org/10.3390/su11185054

Khan, A., Egbue, O., Palkie, B., & Madden, J. (2017). Active Learning: Engaging Students to Maximize Learning in an Online Course. *Electronic Journal of E-Learning*, *15*(2), 107–115.

Khine, M. S., Afari, E., & Ali, N. (2019). Investigating Technological Pedagogical Content Knowledge competencies among trainee teachers in the context of ICT

course. *Alberta Journal of Educational Research*, *65*(1), 22–36. https://doi.org/10.1037/t73466-000

Kim, H., & Kim, H. (2017). Investigating Teachers' Pedagogical Experiences with Tablet Integration in Korean Rural Schools. *Asia-Pacific Education Researcher (Springer Science & Business Media B.V.)*, *26*(1/2), 107–116. https://doi.org/10.1007/s40299-017-0331-8

Kim, J. (2020). Learning and Teaching Online during COVID-19: Experiences of Student Teachers in an Early Childhood Education Practicum. *International Journal of Early Childhood*, *52*(2), 145–158. https://doi.org/10.1007/s13158-020-00272-6

Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT Model for Technology Integration in Teacher Preparation. *Contemporary Issues in Technology and Teacher Education*, 20(1) https://citejournal.org/volume-20/general/the-picrat-model-for-technology integration in teacher preparation

Kimmons, R., & Johnstun, K. (2019). Navigating Paradigms in Educational Technology. *TechTrends: Linking Research & Practice to Improve Learning*, *63*(5), 631–641. https://doi.org/10.1007/s11528-019-00407-0

Koehler, M. J., & Mishra, P. (2009). Technological Pedagogical Content Knowledge (TPACK): The development and validation of an assessment instrument for preservice teachers. *Contemporary Issues in Technology and Teacher Education*, *9*(1), Article 1.

Kondos, S. (2018). The Effect of the Use of Technology on the Nature of Teacher's Profession. *Arab World English Journal*, *9*(1), 220–232. https://doi.org/10.24093/awej/vol9no1.16

Kozikoğlu, İ., & Albayrak, E. N. (2022). Teachers' attitudes and the challenges they experience concerning individualized education programs (IEP): A mixed method study. *Participatory Educational Research*, *9*(1), 98–115. https://doi.org/10.17275/per.22.6.9.1

Kuykendall, M. (2022). *4 Common Obstacles to Implementing Inquiry-Based Learning—And How to Overcome Them*. Edutopia. https://www.edutopia.org/article/4-common-obstacles-implementing-inquiry-based-learning-and-how-overcome-them/

Lalima, & Dangwal, K. L. (2017). Blended Learning: An Innovative Approach. *Universal Journal of Educational Research*, *5*(1), 129–136. https://doi.org/10.1007/s10639-020-10245-w

Lam, P. L. C., Ng, H. K. Y., Tse, A. H. H., Lu, M., & Wong, B. Y. W. (2021). eLearning Technology and the Advancement of Practical Constructivist Pedagogies: Illustrations from Classroom Observations. *Education and Information Technologies*, *26*(1), 89–101. https://doi.org/10.1007/s10639-020-10245-w

Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research*, *77*(4), 575–614. https://doi.org/10.3102/0034654307309921

Liao, Y.-C., Ottenbreit-Leftwich, A., Glazewski, K., & Karlin, M. (2021). Coaching to support teacher technology integration in elementary classrooms: A multiple case study. *Teaching and Teacher Education*, *104*, 103384. https://doi.org/10.1016/j.tate.2021.103384

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications, Inc.

Liu, A., Liu, N., & Wang, A. (2022). Why can't rural schools retain young teachers? An analysis of the professional development of rural school teachers in China: Taking teachers in rural western China. *Social Sciences & Humanities Open*, *5*(1), 100238. https://doi.org/10.1016/j.ssaho.2021.100238

Liza, K., & Andriyanti, E. (2020). Digital Literacy Scale of English Pre-Service Teachers and Their Perceived Readiness toward the Application of Digital Technologies. *Journal of Education and Learning (Edu Learn)*, *14*(1), 74–79. https://doi.org/10.11591/edulearn.v14i1.13925

Lyublinskaya, I., & Kaplon-Schilis, A. (2022). Analysis of Differences in the Levels of TPACK: Unpacking Performance Indicators in the TPACK Levels Rubric. *Education Sciences*, *12*(2), 79. https://doi.org/10.3390/educsci12020079

M. Alizadeh Jamal, A. Shahvarani, Ali Iranmanesh, & A. Tehranian. (2020). The effect of mathematical education based on TPACK model on changing teachers' beliefs. *Fanāvarī-i Āmūzish*, *14*(3), Article 3. https://doi.org/10.22061/jte.2019.4990.2148

Manor, I., & Kampf, R. (2022). Digital Nativity and Digital Diplomacy: Exploring conceptual differences between digital natives and digital immigrants. *Global Policy*. https://doi.org/10.1111/1758-5899.13095

Marguerite G. Lodico, Dean T. Spaulding, & Katherine H. Voegtle. (2010). *Methods in Educational Research: From Theory to Practice: Vol. 2nd ed*. Jossey-Bass.

Marie, S. M. J. A. (2021). Improved pedagogical practices strengthen the performance of student teachers by a blended learning approach. *Social Sciences & Humanities Open*, *4*(1). https://doi.org/10.1016/j.ssaho.2021.100199

Martin, B. A. (2021). Teachers' Perceptions of Google Classroom: Revealing Urgency for Teacher Professional Learning. *Canadian Journal of Learning and Technology*, *47*(1). https://doi.org/10.21432/cjlt27873

Massey, C., Dogan, S., Muhammad, E., Hogan, E, Head, C, & Kim, J. (2022). The Effect of Flipped Instruction on Special Education Preservice Teachers' Perceptions. *International Journal for the Scholarship of Teaching and Learning*, *16*(2). https://doi.org/10.20429/ijsotl.2022.160213

May Luu Yeong, Ismail, R., Ismail, N. H., & Hamzah, Mohd. I. (2018). Interview Protocol Refinement: Fine-Tuning Qualitative Research Interview Questions for Multi-Racial Populations in Malaysia. *Qualitative Report*, *23*(11), 2700–2713. https://doi.org/10.46743/2160-3715/2018.3412

Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation* (2nd ed.). Jossey-Bass.

Merriam, S. B., & Grenier, R. S. (2019). *Qualitative research in practice: Examples for discussion and analysis* (Second edition.). Jossey-Bass.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (Fourth edition.). Jossey-Bass.

Michela, E. (2019). *Universal Design for Learning: Implementation of Technology in Lesson Plans*. 60. https://scholarsarchive.byu.edu/ipt_projects/21

Mishra, P. (2019). Considering Contextual Knowledge: The TPACK Diagram Gets an Upgrade. *Journal of Digital Learning in Teacher Education*, *35*(2), 76–78. https://doi.org/10.1080/21532974.2019.1588611

Mishra, P. (2018, September 10). The TPACK diagram gets an upgrade. *Punya Mishra's Web*. https://punyamishra.com/2018/09/10/the-tpack-diagram-gets-an-upgrade/

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), Article 6. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Nail, A., & Townsend, J. S. (2018). Do teachers dream of electric classrooms? The experiences of future teachers teaching writing online. *Writing & Pedagogy*, *10*(1/2), 221–240. https://doi.org/10.1558/wap.33350

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, B., MD. (1978). *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research* (Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (Stock No. 017-040-00433-8, $1.50).).

Nelson, M. J., & Hawk, N. A. (2020). The impact of field experiences on prospective preservice teachers' technology integration beliefs and intentions. *Teaching and Teacher Education*, *89*. https://doi.org/10.1016/j.tate.2019.103006

Nicol, A. A. M., Owens, S. M., Le Coze, S. S. C. L., MacIntyre, A., & Eastwood, C. (2018). Comparison of High-Technology Active Learning and Low-Technology Active Learning Classrooms. *Active Learning in Higher Education*, *19*(3), 253–265. https://doi.org/10.1177/1469787417731176

Niess, M. L. (2005). *Teaching and Teacher Education*, *21*(5), 509. https://doi.org/10.1016/j.tate.2005.03.006

Office of Educational Technology. (2017). *Reimagining the role of technology in education*. https://tech.ed.gov/files/2017/01/NETP17.pdf

Ok, M. W., & Rao, K. (2019). Digital Tools for the Inclusive Classroom: Google Chrome as Assistive and Instructional Technology. *Journal of Special Education Technology*, *34*(3), 204–211. https://doi.org/10.1177/0162643419841546

Oliphant, S. M., & Bennett, C. S. (2020). Using reflexivity journaling to lessen the emic–etic divide in a qualitative study of Ethiopian immigrant women. *Qualitative Social Work*, *19*(4), 599–611. https://doi.org/10.1177/1473325019836723

Oppi, P., & Eisenschmidt, E. (2022). Developing a professional learning community through teacher leadership: A case in one Estonian school. *Teaching and Teacher Education: Leadership and Professional Development*, *1*. https://doi.org/10.1177/0162643419841546

Papert, S., & Harel, I. (1991). *Situating Constructionism*. 17.

Paul, J., & Jefferson, F. (2019). A comparative analysis of student performance in an online vs. Face-to-face environmental science course from 2009 to 2016. *Frontiers in Computer Science*, *1*. https://doi.org/10.3389/fcomp.2019.00007

Puentedura, R. (2006). *Transformation, Technology, and Education*. http://hippasus.com/resources/tte/puentedura_tte.pdf

Ravitch, S. M., & Carl, N. (2016). *Qualitative research: Bridging the conceptual, theoretical, and methodological*. Sage Publications.

Redman, B. K., & Caplan, A. L. (2021). Should the Regulation of Research Misconduct Be Integrated with the Ethics Framework Promulgated in The Belmont Report? *Ethics & Human Research*, *43*(1), 37–41. https://doi.org/10.1177/0162643419841546

Regan, K., Evmenova, A. S., Sacco, D., Schwartzer, J., Chirinos, D. S., & Hughes, M. D. (2019). Teacher Perceptions of Integrating Technology in Writing. *Technology, Pedagogy and Education*, *28*(1), 1–19. https://doi.org/10.1080/1475939X.2018.1561507

Rice, M. F. (2022). Special education teachers' use of technologies during the COVID-19 ERA (Spring 2020—Fall 2021). *TechTrends*, *66*(2), 310–326. https://doi.org/10.1007/s11528-022-00700-5

Rolf, E., Knutsson, O., & Ramberg, R. (2019). An analysis of digital competence as expressed in design patterns for technology use in teaching. *British Journal of Educational Technology*, *50*(6), 3361–3375. https://doi.org/10.1111/bjet.12739

Ross, P. T., & Bibler Zaidi, N. L. (2019). Limited by our limitations. *Perspectives on Medical Education*, *8*(4), 261–264. https://doi.org/10.1007/S40037-019-00530-X

Rowston, K., Bower, & Woodcock, S. (2021). The impact of prior occupations and initial teacher education on post-graduate pre-service teachers' conceptualization and

realization of technology integration. *International Journal of Technology and Design Education*. https://doi.org/10.1007/s10798-021-09710-5

Sackstein, S., Spark, L., & Turner, B. (2019). Technology in the Classroom: Teachers' Mobile Technology Choices in Relation to Content Creation and Distribution. *Issues in Informing Science & Information Technology*, *16*, 235–254. https://doi.org/10.28945/4316

Saldana, J., & Mallette, L. A. (2017). Environmental Coding: A New Method Using the SPELIT Environmental Analysis Matrix. *QUALITATIVE INQUIRY*, *23*(2), 161–167. https://doi.org/10.1177/1077800416679143

Scherer, R., Tondeur, J., Siddiq, F., & Baran, E. (2018). The importance of attitudes toward technology for pre-service teachers' technological, pedagogical, and content knowledge: Comparing structural equation modeling approaches. *Computers in Human Behavior*, *80*, 67–80. https://doi.org/10.1016/j.chb.2017.11.003

Sedova, K., Sedlacek, M., Svaricek, R., Majcik, M., Navratilova, J., & Drexlerova, A. (2019, October). *Do those who talk more learn more? The relationship between student classro...: @ Walden University Library*. Learning and Instruction.

Shih-Hsiung Liu, Hsien-Chang Tsai, & Yu-Ting Huang. (2015). Collaborative Professional Development of Mentor Teachers and Pre-Service Teachers in Relation to Technology Integration. *Journal of Educational Technology & Society*, *18*(3), 161–172.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), Article 2. https://doi.org/10.2307/1175860

Singh, M. (2022). E-6 Preservice Teachers and Elementary Science Teaching: Assessing Confidence and Content Knowledge. *Journal of College Science Teaching*, *51*(3), 51–58.

Singhavi, C., & Basargekar, P. (2019). Barriers Perceived by Teachers for Use of Information and Communication Technology (ICT) in the Classroom in Maharashtra, India. *International Journal of Education and Development Using Information and Communication Technology*, *15*(2), Article 2.

Siyam, N. (2019). *Factors Impacting Special Education Teachers' Acceptance and Actual Use of ...: @ Walden University Library*.

Spiteri, M., & Chang Rundgren, S.-N. (2020). Literature Review on the Factors Affecting Primary Teachers' Use of Digital Technology. *Technology, Knowledge, and Learning*, *25*(1), 115–128. https://doi.org/10.1007/s10758-018-9376-x

Stauffer, B. (n.d.). *What's the Difference Between Online Learning and Distance Learning?* https://www.aeseducation.com/blog/online-learning-vs-distance-learning

Stetter, M. (2018). The Use of Technology to Assist School-Aged Students with High Incidence Special Needs in Reading. *Education Sciences*, *8*(2), Article 2. https://doi.org/10.3390/educsci8020061

Tal – Alon, N., & Shapira – Lishchinsky, O. (2019). Ethical dilemmas among teachers with disabilities: A multifaceted approach. *Teaching and Teacher Education, 86*, 102881. https://doi.org/10.1016/j.tate.2019.102881

Tauhid Hossain Khan & Ellen MacEachen. (2022). An Alternative Method of Interviewing: Critical Reflections on Videoconference Interviews for Qualitative Data Collection. *International Journal of Qualitative Methods, 21*. https://doi.org/10.1177/16094069221090063

Texas Education Agency. (2021). *Staar Performance Standards.* Texas Education Agency. https://tea.texas.gov/student-assessment/testing/staar/staar-performance-standards

Theofanidis, D., & Fountouki, A. (2018). Limitations and Delimitations in the Research Process. *Perioperative Nursing*, *7*(3), Article 3. https://doi.org/10.5281/zenodo.2552022

Top, E., Baser, D., Akkus, R., Akayoglu, S., & Gurer, M. D. (2021). Secondary school teachers' preferences in the process of individual technology mentoring. *Computers & Education*, *160*, 104030. https://doi.org/10.1016/j.compedu.2020.104030

Tseng, J.-J., Cheng, Y.-S., & Yeh, H.-N. (2019). How pre-service English teachers enact TPACK in the context of web-conferencing teaching: A design thinking approach. *Computers & Education*, *128*, 171–182. https://doi.org/10.1016/j.compedu.2018.09.022

Ugur, A., Ozdemir, F., & Omur, Y. E. (2022). Opinions of Teachers on the Role of Teachers, Students, and Parents in the Education of the Future. *International Online Journal of Educational Sciences*, *14*(3), 792–806. https://doi.org/10.15345/iojes.2022.03.015

Utama, C., Sajidan, Nurkamto, J., & Wiranto. (2019). Using TPACK as a framework to analyze TLC model. *Journal of Physics: Conference Series*, *1175*. https://doi.org/10.1088/1742-6596/1175/1/012146

Valtonen, T., Sointu, E., Kukkonen, J., Kontkanen, S., Lambert, M. C., & Mäkitalo-Siegl, K. (2017). TPACK updated to measure pre-service teachers' twenty-first century skills. *Australasian Journal of Educational Technology*, *33*(3), 15–31. https://doi.org/10.14742/ajet.3518

van Laar, E., van Deursen, A., van Dijk, J., & de Haan, J. (2020). Determinants of 21st-Century Skills and 21st-Century Digital Skills for Workers: A Systematic Literature Review. *SAGE Open*, *10*, 1–14. https://doi.org/10.1177/2158244019900176

Vaportzis, E., Giatsi Clausen, M., & Gow, A. J. (2017). Older Adults' Perceptions of Technology and Barriers to Interacting with Tablet Computers: A Focus Group Study. *Frontiers in Psychology*, *8*, 1687. https://doi.org/10.3389/fpsyg.2017.01687

Vedechkina, M., & Borgonovi, F. (2021). *A Review of Evidence on the Role of Digital Technology in Shaping Attention and Cognitive Control in Children*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.611155/full

Ventouris, A., Panourgia, C., & Hodges, S. (2021). Teachers' perceptions of the impact of technology on children and Young People's emotions and behaviours. *International Journal of Educational Research Open*, *2*. https://doi.org/10.1016/j.ijedro.2021.100081

Vongkulluksn, V. W., Xie, K., & Bowman, M. A. (2018). The role of value on teachers' internalization of external barriers and externalization of personal beliefs for classroom technology integration. *Computers & Education*, *118*, 70–81. https://doi.org/10.1016/j.compedu.2017.11.009

Wang, L., Ertmer, P. A., & Newby, T. J. (2004). *Journal of Research on Technology in Education*, *36*(3), 231. https://doi.org/10.1080/15391523.2004.10782414

Wang, W., Schmidt-Crawford, D., & Jin, Y. (2018). Preservice Teachers' TPACK Development: A Review of Literature. *Journal of Digital Learning in Teacher Education*, *34*(4), 234–258. https://doi.org/10.1080/21532974.2018.1498039

West, J., & Malatji, M. J. (2021). Technology Integration in Higher Education: The use of Website Design Pedagogy to Promote Quality Teaching and Learning. *Electronic Journal of E-Learning*, *19*(6), pp629-641. https://doi.org/10.34190/ejel.19.6.2557

Winter, E., Costello, A., O'Brien, M., & Hickey, G. (2021). Teachers' use of technology and the impact of covid-19. *Irish Educational Studies*, *40*(2), 235–246. https://doi.org/10.1080/03323315.2021.1916559

Xie, K., Kim, M., Cheng, S.-L., & Luthy, N. (2017). Teacher professional development through digital content evaluation. *Educational Technology Research & Development*, *65*(4), 1067–1103. https://doi.org/10.1007/s11423-017-9519-0

Xie, K., Nelson, M. J., Cheng, S.-L., & Jiang, Z. (2021). Examining changes in teachers' perceptions of external and internal barriers in their integration of educational digital resources in K-12 classrooms. *Journal of Research on Technology in Education*, 1–26. https://doi.org/10.1080/15391523.2021.1951404

Xie, K., Vongkulluksn, V. W., Justice, L. M., & Logan, J. A. R. (2019). Technology acceptance in context: Preschool teachers' integration of a technology-based early language and literacy curriculum. *Journal of Early Childhood Teacher Education*, *40*(3), 275–295. https://doi.org/10.1080/10901027.2019.1572678

Xie, S., & Li, H. (2018). Perspectives on readiness for preschool: A mixed-methods study of Chinese parents, teachers, and principals. *Children and Youth Services Review*, *95*, 19–31. https://doi.org/10.1016/j.childyouth.2018.10.031

Yang, S., Carter, Jr. R. A., Zhang, L., & Hunt, T. (2021). Emanant themes of blended learning in K-12 educational environments: Lessons from Every Student Succeeds Act. *Computers & Education*, *163*. https://doi.org/10.1016/j.compedu.2020.104116

Yeh, Y.-F., Chan, K. K. H., & Hsu, Y.-S. (2021). Toward a framework that connects individual TPACK and collective TPACK: A systematic review of TPACK studies investigating teacher collaborative discourse in the learning by design

process. *Computers & Education*, *171*. https://doi.org/10.1016/j.compedu.2021.104238

Yilmaz, A. (2021). The effect of technology integration in education on prospective teachers' critical and creative thinking, multidimensional 21st Century skills and academic achievements. *Participatory Educational Research*, *8*(2), 163–199. https://doi.org/10.17275/per.21.35.8.2

Yin, R. (2014). *Applications of Case Study Research: Vol. null* (5, Ed.).

Yin, R. K., Gwaltney, M. K., & Abt Associates, Inc., Washington, DC. (1982). *Design Issues in Qualitative Research: The Case of Knowledge Utilization Studies*.

Young, K. (2018). CO-CREATE: Teachers' Voices to Inform Special Education Teacher Education. *Issues in Educational Research*, *28*(1), Article 1.

Yurtseven Avci, Z., O'Dwyer, L. M., & Lawson, J. (2020). Designing effective professional development for technology integration in schools. *Journal of Computer Assisted Learning*, *36*(2), 160–177. https://doi.org/10.1111/jcal.12394

Appendix A: Mishra's TPACK Image Permission

Hello·Dr.·Mishra,¶
°¶
I·am·a·doctoral·student·at·Walden·University·seeking·a·degree·in·EDD·P-20·Self·Design.·I·am·currently·in·my·proposal·stage.·My·Proposed·Title·for·my·project·study:·Special·Education·Teachers'·Perception·of·Technology·Integration·and·its·use·in·Secondary·Classroom·Instruction.¶
My·Conceptual·Framework·is·TPACK.·Therefore,·I·am·seeking·permission·to·use·the·TPACK·Diagram.°¶
°¶
Punya·Mishra°(2019)°Considering·Contextual·Knowledge:·The·TPACK·Diagram·Gets·an·Upgrade,°Journal·of·Digital·Learning·in·Teacher·Education,°35:2,°76-78,°DOI:°10.1080/21532974.2019.1588611¶
¶
¶
Respectfully·yours,¶
Carla·Windfont¶
¶

¶

---¶

Punya·Mishra°<punya.mishra@asu.edu>¶
To:§Carla·Windfont§¶
Thu·3/31/2022·4:26·PM¶
Thank·you·for·your·note·and·interest·in·the·TPACK·framework.·You·can·find·information·on·citing·the·diagram·on·this·page¶
https://punyamishra.com/2018/09/10/the-tpack-diagram-gets-an-upgrade/¶
°¶
thanks¶
°¶
~·punya¶
_____¶
Punya·Mishra¶
Mary·Lou·Fulton·Teachers·College° ¶
Arizona·State·University¶
°¶
517-303-9567°°¶
learningfutures.education.asu.edu¶
punyamishra.com°¶

Appendix B: Participant Interview Protocol

Interview Script:

Welcome and Introduction

- "Hello, thank you for volunteering to participate in a research study about secondary special education teachers' perceptions of technology integration and its use in classroom instruction. I am a doctoral candidate at Walden University. Your participation today will provide me with valuable data."

Orally read the information in the informed consent form and confirm permission to conduct the interview.

- "The contents of this interview will be used for my research study with the potential of informal presentation at conferences and publications. I will not use your name or other identifying markers to connect you to my written work, oral presentation, or publication. This local school district will be called Texas School District 1 (TSD1) to remain anonymous. You are free at any time to withdraw from the research study. I will destroy all recordings and transcriptions after the study has been approved after five years from data collection and final research presentation. I will share the notes from our interview to ensure the accuracy and transparency of the data collection process. This study offers no direct benefits to individual volunteers. This study aims to benefit society by informing the work of many secondary special education educators, thereby promoting positive social change in the professional learning community."
-

This study seeks 12-15 Volunteers who are:

- Secondary special education resource or collaborative teachers in your local school district.
- Have been continuously employed with this local district since 2021, serving in the secondary special education teacher role.

Explain the purpose of the recording and reviewing of data for my research study

- "Our interview today will be recorded. My transcription of the interview is viable for the data collection process; therefore, recording the interview assists me with my notetaking and data collection. I will destroy all recordings and transcriptions via paper-based shredding and electronic deletion after the study has been approved after five years from data collection and final research presentation."
- "30-40 minutes interview with 12 open-ended questions related to technology integration in the classroom."

Restate the Purpose of the Study

- The purpose of this research study is to investigate secondary teachers' descriptions of their technological pedagogical content knowledge in relation to their subject-matter expertise and the factors that affect their technology integration decisions.

“Do I have your permission to start the interview?”

“**Do you have any questions for me before we begin?”**

Initial Prompting

- “Please tell me your experiences as a special education classroom teacher; the number of years you have been with TSD1; the number of years in the teaching profession; the grades taught at the secondary level; the subject-content areas taught.”

Questions

- How would you describe technology integration at the secondary education level? (RQ1, Technology Integration)
- What technology programs do you currently use in your classroom and why did you choose them? (RQ2, TPCK)
- Do you feel the school district provided special education teachers with Specially Design Instruction for Blended Learning, replacing traditional classroom instruction? (RQ2, TPCK)
- What challenges have you encountered with technology integration in secondary special education classrooms? (RQ1, Technology Integration)
- How do you view the digital shift in education and the impact on your technology integration and ability to teach special education students? (RQ1, Technology Integration)
- What changes have your school district made since 2021 to assist special education teachers with content structure and teaching strategies to improve SPED teachers’ willingness to incorporate technology integration in their lesson plans? RQ1, Technology Integration)
- What teaching strategies have you adapted to increase your technology and specific-content knowledge for standards-based learning in the classroom? (RQ2, TPCK)
- Describe the types of technology programs you use in your classroom and how they connect to your special education students’ disabilities. (RQ1, Technology Integration)
- When comparing instructional strategies previously used in your teaching experience, describe what processes you feel have been most effective in technology learning and teaching implementation in special education classrooms? (RQ2, TPCK)
- When comparing your pedagogical knowledge vs. technological knowledge, explain in your opinion the relationship between the two and whether you feel

proficient professional development has been equitably provided for secondary special education teachers. (RQ2, TPCK)

Conclusion

- "Are there any questions you would like to go back and address or is there any additional information you would like to include regarding the question subject area?
- "This concludes our interview process, and I would like to thank you for participating. Remember, once I have transcribed our interview, I will send you a copy to verify the accuracy of the transcription."

STOP Recording

Appendix C: Field Test Review Data Forms

Field Participant #:_____

Criteria	Operational Definitions	Score 1=below expectations 2=approaches expectations 3= meet expectations 4=masters expectations	Question Not Meeting Standard add the reason why not
Clarity	• The questions are direct and specific • Questions asked one at a time • The participant can understand what is being asked. • There were no (double) two questions asked in one.		
Wordiness	• Question clear and concise • Extra words in questions • Words with double meaning		
Negative Wording	• Questions asked in an affirmative manner		
Criteria	• **Operational Definitions**	**Score** **1=below expectations** **2=approaches expectations** **3= meet expectations** **4=masters expectations**	**Question Not Meeting Standard add the reason why not**
Overlapping Response	• No response covers more than one choice • The questions are providing answer to the research question		
	•		
Balance	• Questions were neutral tone to eliminate bias		
Use Jargon	• Terms did not need an additional explanation for the targeted population		

Appropriateness of Responses	• The responses could be applied in a way that participants could respond					
Use Technical Languages	• Limited acronyms • Limited use of technical language					
Criteria	• **Operational Definitions**	**Score** **1=below expectations** **2=approaches expectations** **3= meet expectations** **4=masters expectations**				**Question Not Meeting Standard add the reason why not**
Best Practices	• Questions asked were related to the participants' best practices					
Relationship to Problem	• Questions were sufficient to address the research problem					
Total						

Appendix D: Initial Codes

1. Open eyes
2. Tablets
3. Chromebooks
4. Google Slides
5. Nearpod
6. Heavy technology
7. Challenges
8. Padlet
9. Digital Shifts
10. Instructions
11. Computer Concepts
12. Different programs
13. Reinforce content
14. PowerPoint
15. Books application
16. supplement lessons
17. Targeted topics
18. Tech practice
19. Tech tweaking
20. more tech activities
21. student teaching
22. Build Activities
23. Hybrid implantation
24. Hybrid references
25. Students' teachers
26. Incorporate tech
27. Internet reliability
28. District technology
29. Teachers teach
30. Tech for EB learners
31. Pedagogy balance
32. Intertwine Tech
33. Intertwine Pedagogy
34. WiFi system poor
35. Limited devices
36. Necessary
37. Lesson Plans
38. Too Much Tech Access
39. Audio Reading
40. Reading tools
41. Difficult for resource
42. Cambrium test site
43. Accommodations
44. Spelling assistance
45. Test-to-speech
46. All programs
47. Availability
48. Daily tech access
49. Lost devices
50. Class size
51. Student needs
52. Time
53. Materials
54. Develop assignments
55. Connectivity
56. Software training
57. Artificial intelligence
58. Extra training
59. Class loads
60. Student connections
61. Internet trouble
62. Connection signal
63. Google classroom
64. Quisses
65. Pear Deck
66. Jam board
67. EDD Puzzle
68. Kahoot
69. Delta Math
70. Flocabulary
71. EdPuzzle
72. Google Slides
73. Google Form
74. CommonLit
75. Desmos
76. Google Slide
77. Gimp Kit
78. Booklet Program
79. Padlet
80. EdPuzzle
81. Canva
82. Desmos lessons
83. Open eye
84. Different style
85. Teaching looks like
86. teaching could be
87. digital shifts
88. Distractions with Chromebook
89. Extreme necessary
90. Take aways
91. Outside influences
92. New tech tools
93. Tech opportunities
94. YouTube
95. How to Videos
96. Visual Supports
97. Difficulty
98. transfer learning
99. Easy to see mistakes
100. E-Collaboration
101. Very accepting
102. Move forward
103. Technology progress
104. Fingertip access
105. Time management
106. Adjust courses
107. Technology resources
108. Pandemic
109. Helps not hinder SPED
110. Positive digital
111. Spelling assistance
112. Online dictionaries
113. More beneficial
114. Smart boards
115. Lack autonomy
116. Need training
117. Lesson planning
118. In-service Training
119. Teach same thing
120. Backups
121. Gen Ed lessons
122. Modify lessons
123. Readily available
124. Staff development
125. Better descriptions
126. Visual cues
127. New tech apps
128. Prof Dev since 2021
129. More training
130. Differentiates instruction
131. Provide more technology
132. Personal devices
133. District devices
134. More resources
135. Tech licenses
136. management systems
137. Geared toward Gen Ed

138. Not geared for SPED
139. Integrate lessons
140. Teacher-friendly
141. Student-friendly
142. More common math
143. Provide more PD
144. COVID influence
145. Help those students
146. Provide resource tools
147. complete assignments
148. More Chromebook work
149. student accommodations
150. Developmental settings
151. Teach us technology
152. Multiple PD
153. Comfortable with tech
154. Listen to technology
155. Learn different programs
156. Comfortable pedagogy
157. Leading technology
158. Pedagogical knowledge
159. Limited tech knowledge
160. Successful in classroom
161. Stepped up 100%
162. Initially overwhelming
163. Ideas for classroom
164. Aid in our instruction
165. 40% tech integration
166. 50% tech integration
167. Tech has been better
168. Beneficial and feasible
169. Highly needed
170. Integration opportunities
171. Several integrations level
172. Google Classroom
173. Technology
174. Very good
175. Google Sheets
176. ReadWorks
177. Newsla
178. Sora
179. Tech tools
180. SPED teachers' tools
181. Different apps
182. Kid-friendly usage
183. Full capacity
184. Lack paper and pen work
185. CommonLit
186. Studysync
187. Technology check
188. Student tech check
189. Teacher tech check
190. Available resources
191. Insight
192. Common Math
193. Use more PD
194. Help students
195. Additional notes
196. Accommodation course
197. Ongoing training
198. Learn and refresh
199. Various platforms
200. Blended learning
201. Extensive in-service
202. Various levels of entry
203. Learning environment
204. SDI
205. Presentation
206. Quizziz
207. Edpuzzle
208. Modified instruction
209. Reading capabilities
210. Different tech every day
211. Watch CNN 10
212. Data entry
213. Chromebooks
214. Time management
215. Google
216. Added features
217. Tools
218. APPS
219. Online textbooks
220. Modification per subject
221. Updated reading
222. GIMP kit
223. Gaming sites
224. Abundant information
225. Share technology
226. Explain to kids
227. Limited at Resource level
228. Desmos
229. Verbal programs
230. Student work-centered
231. Google Classroom
232. Graphic Organizers
233. Easy access
234. Free thinking
235. Free responses
236. Edpuzzle
237. Pear Deck
238. Online dictionaries
239. Attention grabbers
240. Videos
241. Guide themselves
242. Being present
243. Ask questions
244. Games
245. TEKS connection
246. Desmos
247. Goggle Classrooms
248. Google Classrooms
249. Chromebook help
250. Text to speech
251. Access to content
252. McGraw Hill
253. Flipgrid
254. Google District
255. Google Classroom
256. Google Docs
257. Differentiate online
258. Online posting
259. Snowflake
260. Snowflake
261. More Hands-on
262. Afraid of Technology
263. Tech tool applications
264. What's available
265. Different APPS
266. Tech skills in practice
267. More tech access
268. Tech characteristics
269. Note-taking
270. Traditional classroom
271. Lack note-taking
272. Don't refer to notes
273. Computer navigation
274. Benefits of technology
275. Tech world
276. Constantly learning
277. Constantly growing
278. Tech saturation
279. Scaffolding
280. Show them

281. Show Me
282. Learn technology
283. Build
284. More comfortable
285. Navigation
286. Various tech software
287. Tech tools
288. Improve instruction
289. What tech to use
290. How tech is use
291. Incompetent
292. Notes
293. Word processing
294. Navigation
295. Tools
296. Resources
297. Uncomfortable
298. Skills
299. Practice
300. Benefits
301. COVID
302. Pandemic
303. Propel
304. Home
305. Asynchronous
306. Synchronous
307. Online
308. Traditional
309. Lesson plans
310. Planning
311. Collaborate
312. Time
313. Teams
314. Subject
315. Content
316. Dialogue
317. Application
318. Improvement
319. Increase
320. Anxious
321. Anxiety
322. Nervous
323. Administrators
324. Administration
325. Technology
326. Pedagogy
327. Willingness
328. Challenge
329. Special training
330. Gen Ed lessons
331. Staff development
332. New technology
333. Applications
334. Trainers
335. Beneficial
336. Resources
337. PD
338. Tech training
339. StemScope lessons
340. Lesson plans
341. Differentiate Lessons
342. Student needs
343. Access
344. Personal devices
345. Lesson Mapping
346. Accommodate students
347. More resources
348. Licensing
349. Learning management
350. Smart board
351. Autonomy
352. Basic training
353. More training
354. Assist w/lessons
355. Incorporate tech
356. How to plan
357. In-service
358. Trainings
359. District lessons
360. Tech in lessons
361. PD opportunities
362. Gen Ed geared
363. Not SPED oriented
364. Prof. development
365. Tools
366. Resources
367. Help integration
368. Help with lessons
369. Different setting
370. SPED tech setting
371. Multiple PD levels
372. Learning levels
373. Comfortability
374. Listen
375. Different technology
376. Best fit
377. Leading technology
378. Teacher comfortable
379. Pedagogy
380. Developing
381. Pedagogical knowledge
382. Multitask
383. Ability level
384. How to incorporate
385. Tech knowledge
386. Pedagogy knowledge
387. More successful
388. Increase 100%
389. Overwhelming
390. COVID
391. Assignments
392. Chromebooks
393. Videos
394. 40% Integration
395. aid in instruction
396. half technology
397. definitely integrated
398. necessary
399. definitely integrated
400. beneficial
401. feasible
402. highly needed
403. instruction levels
404. several opportunities
405. different APPS
406. full capacity
407. away from paper
408. CommonLit
409. Studysync
410. Thrown in
411. Very instrumental
412. Technology resources
413. Beneficial
414. tool check
415. Technology inventory
416. Professional dev
417. Prof. development
418. Don’t know
419. Help with tools
420. More insight
421. Definitely
422. More math
423. Yes, help
424. Help students

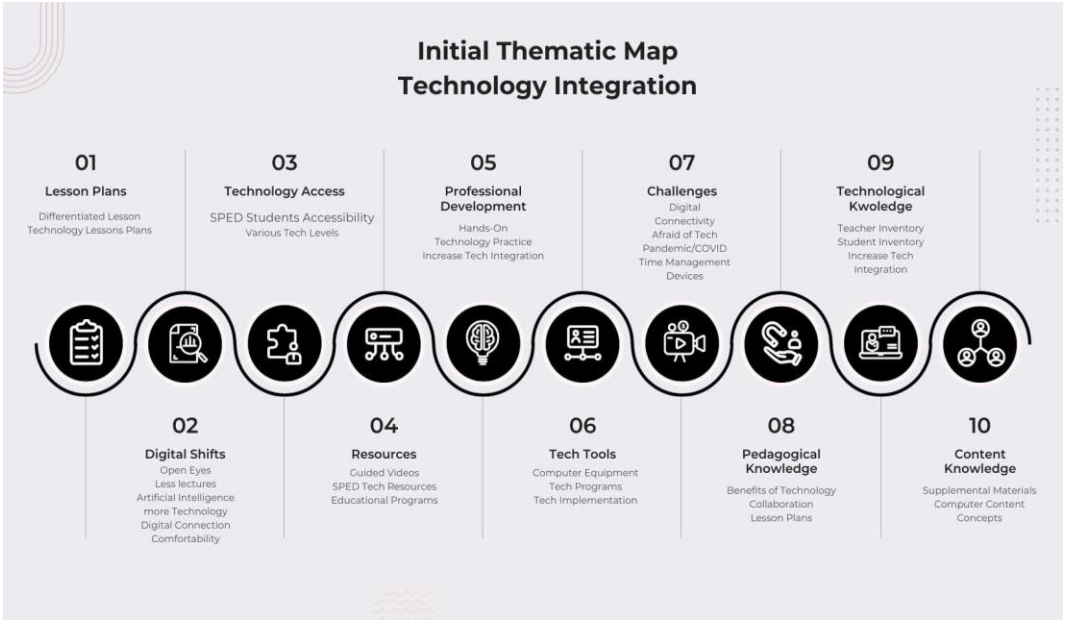
425. Additional notes
426. Accommodations
427. Personal needs
428. 60% traditional
429. Ongoing trainings
430. Opportunities to learn
431. Refresh knowledge
432. Implementation yearly
433. Platforms
434. Blended learning
435. Yes
436. Extensive trainings
437. Providing things
438. Receiving information
439. Video versus lecture
440. Particular portion
441. Spared environment
442. Could use more
443. District provides
444. SDI
445. Quizzes
446. EdPuzzle
447. Same lessons
448. Reliability levels
449. Speak with kids
450. Everyday different tech
451. Watching CNN 10
452. Input their answers
453. Their Chromebooks
454. Spending 10 minutes
455. Microphones
456. Google speak
457. Google docs
458. Tool app
459. Textbook online
460. Studysync
461. Good accommodations
462. tech setup
463. New standards
464. Read the info
465. GIMP kit
466. Gaming sites
467. Way to modify
468. Assessments via games
469. Tech help others
470. Abundance of info
471. Share Ed world
472. Tech help explain
473. Ongoing
474. Not for resource level
475. Desmos
476. Verbal program
477. Students learn better
478. Focus on students
479. Students doing the work
480. Google Classrooms
481. Graphic Organizers
482. Easily access APP
483. Central location
484. Free thinking
485. Free response
486. Better response
487. EdPuzzle
488. Pear Deck
489. Online dictionaries
490. Attention grabbers
491. Like videos
492. Attention
493. Guide themselves
494. Being present
495. Ask questions
496. Games to add TEKS
497. Concept oriented
498. Computed-based tech
499. Different programs
500. Reinforces quizzes
501. Kids do lessons
502. PowerPoint
503. Breakdown Passages
504. Supplemental lessons
505. Targeted online lessons
506. Prepare students
507. Student Success
508. Show work
509. Teachers talk less
510. Transformative
511. Tech utilization
512. More assignments
513. Tech practice
514. Tweaking things
515. Using things that work
516. Truly hybrid
517. Learn the technology
518. Students teach me
519. Learn to use it
520. Incorporate tech
521. Lessons to help
522. Help EB learners
523. Pedagogy help
524. Tech side of things
525. Allow me to practice
526. away from lectures
527. cover pedagogy
528. pedagogical knowledge
529. intertwined knowledge
530. using programs
531. getting used to it
532. Wi-Fi systems poor
533. restore Chromebooks
534. prepare lesson types
535. too much access
536. need things read to them
537. don't offer reading
538. access to technology
539. resource environment
540. Cambium test
541. Turn on accommodations
542. Text to speech
543. Spelling assistance
544. Tech availability
545. All programs access
546. Enough Chromebooks
547. Class Chromebooks
548. Lost Chromebook
549. Misplaced Chromebook
550. Damaged Chromebook
551. Individual student needs
552. needs individually
553. time
554. materials
555. software training
556. assignments
557. digital connections
558. Artificial intelligence
559. Extra trainings
560. Learning programs
561. Google Classroom
562. Quizzes
563. Quizlet
564. Pear Deck
565. JamBaord
566. EdPuzzle
567. Kahoot

568. Delta Math
569. Flocabulary
570. EdPuzzle
571. Google Slides
572. Google Forms
573. EdPuzzle
574. CommonLit
575. Desmos
576. Booklet
577. Padlet
578. Canva
579. Desmos Lessons
580. Google Classrooms
581. EdPuzzle
582. Text to speech
583. Same materials
584. Same content
585. Flipgrid
586. Google Classroom
587. Google District
588. Google Classroom
589. Help me differentiate
590. Online posting notes
591. Snowflake
592. More Hands-on
593. Afraid of Technology
594. Lapse in knowing tech
595. What tech is
596. What tech is not

Appendix E: Secondary Codes

1. Open Eyes
2. Computer Equipment
3. Technology Tools
4. Digital Shift
5. Pandemic/COVID
6. Google Classroom Products
7. Educational Technology Programs
8. Lesson Plans
9. Technology Instruction
10. Technology Integration Knowledge
11. Content Knowledge
12. Digital Challenges
13. Internet Challenges
14. Technology practice
15. Computer Concepts
16. SPED Technology Resources
17. Pedagogy Knowledge
18. Benefits of Technology Knowledge
19. Increasing Technology Integration
20. SPED Students Accessibility
21. Collaboration
22. Content Knowledge
23. Pedagogical Knowledge
24. Digital Books
25. Technology Implementation
26. Technology Lesson Plans
27. Differentiated Lessons
28. Artificial Intelligence
29. Technology Access
30. Guided Videos
31. Time Management
32. Professional development
33. SPED Student-Centered
34. Various Technology Levels
35. Teacher Technology Inventory
36. Student Technology Inventory
37. Comfortability
38. Supplemental Material
39. Hands-On
40. Afraid of Technology
41. Digital Connections
42. Targeted Lessons
43. Less Lecture
44. More Technology
45. Technological Knowledge

Appendix F: Initial Thematic Map



Note: 45 Secondary Codes (see Appendix E) consolidated to 10 Initial Themes

Appendix G: Final Thematic Map