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Collaboration Experiences and Perceptions in Digital Activities Among Secondary Education Teachers

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Teachers use digital activities for student collaboration; however, it is not known what digital collaboration strategies teachers implement, nor how they perceive students' ability to apply collaboration skills in a digital environment. It is necessary to understand strategies needed by students to be able to collaborate in a digital environment. The purpose of this basic qualitative study was to explore secondary teachers' experiences involving implementing digital collaboration strategies and their perceptions of students' development of digital collaboration skills. Vygotsky's social learning theory and Siemens' connectivism theory were used to guide research questions for this study. Taken together, these theories hold that learning is social in nature and can be technologically enhanced. The criteria for participant selection, via purposeful and snowball sampling, included teaching in a rural mid-Atlantic Title I secondary school that had digital learning initiatives where each student had their own device. Data from 13 semistructured interviews were analyzed using open coding to generate themes. Findings indicated that teachers could use communication, leadership, critical thinking, and problem-solving skills in their secondary classrooms to help students develop digital collaborative skills. This study contributes to social change by providing deeper understanding into the phenomenon. This, in turn, promotes needed skills, including digital collaboration and critical thinking, that can help students become more successful in the classroom.

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Dedication

I dedicate this to my wife Noel for putting up with me through all my educational endeavors. Let us see what is next!

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Chapter 1: Introduction

Working together to accomplish a shared goal or task is key to moving forward at school or in a career. As careers that require collaboration and technology skills become more global, students must be prepared to work and competitive in a global society (Brennan & Dempsey, 2018). Many skills are needed, including leadership, collaboration, communication, critical, analytical and creative thinking, and problem solving to be successful (Wagner et al., 2019). Organizations need members who can collaborate to accomplish goals (Dean & East, 2019). According to Engeness and Edwards (2017), students in secondary education need to develop collaboration skills to be successful. Collaboration skills gained in school may benefit these students in their future.

Social change refers to any significant alteration over time in behavior patterns and norms. Theories of social change involve the likelihood of resistance to change, especially when people with vested interests feel unsettled and threatened by potential changes. Secondary teachers in the classroom are not preparing students for careers that require technology and collaboration skills using current collaborative strategies due in part to their fears of change (Aliyeva & Kelly, 2019). Many secondary education teachers lack sufficient knowledge to apply collaborative strategies in the classroom and resist learning because of the perceived threat that this change may bring about (Howell, 2018). This study may result in increasing teachers' knowledge regarding teachers' perceptions and experiences of how students collaborate with each other in terms of digital activities.

This increased knowledge may yield strategies that could then be implemented in classrooms and could benefit those students.

This chapter is organized to first explain the scope of the study and second justify the literature review and approach taken to address the research problem. This chapter concludes with information regarding the importance of the inquiry and its impact on social change along with a summary of the chapter.

Background

An important skill students learn as part of their education is learning how to collaborate. Collaboration skills includes communication, analytical thinking, and problem solving; these skills are needed when students work together to achieve a shared goal or activity (Mirela, 2018; Schmoelz, 2018). Vygotsky's research of constructivism, wherein students construct their knowledge more effectively when working in social groups has been applied to the classroom by teachers through having students work in collaborative groups. More recently, technology has been designed to promote collaboration within digital environments by using programs similar to Google Slides which are designed to be used collaboratively.

For students to reach shared goals while working on a digital activity or project, they need to have developed collaboration skills to achieve those goals. Collaboration skills are needed in many careers, such as education and engineering, where projects are often collaborative (Dean & East, 2019). With the increase in technology-based instruction in the classroom where the Internet and collaborative tools are available for students to use, collaboration has become more necessary and important (De Vita et al.,

2018). These skills include collaboration, analytical thinking, and problem-solving skills that are important when collaborating in a digital environment (Rahman, 2019). In a secondary classroom, students may be given a collaborative project assignment to create an English presentation that uses a program such as Google Slides or Microsoft Word where they can work together virtually within the same document or project. These collaboration skills connect to future academic needs in college or training entities where students may not physically be together but are still collaborating on a presentation, activity, or task.

Collaboration skills in the classroom need to be developed for the future needs of the 21st century workplace where digital collaborative environments are used such as Google Suite. Teaching collaboration skills while working in a digital environment connects the classroom activity to the collaborative digital environment. Applying this research in a 21st century classroom where an educator is teaching collaboration skills while working in a digital environment connects the classroom activity to collaborative digital environment.

Collaboration usage has increased due to improvements in technology infrastructure such as satellites and Internet connectivity. These improvements in technology infrastructure allow for nearly instantaneous connections between computers that permit people to collaborate digitally (Biljon et al., 2017). Exposing the research problem could lead to better collaboration skills that prove beneficial for students. Collaboration skills need to be explicitly taught in school to ensure that they are in place so students can be competitive in a global society where digital environments such as

Google Docs are in use. These skills will carry over and be beneficial for students to work together in nondigital activities by allowing them to think more deeply and creatively about a subject and develop more empathy for other students' perspectives.

Educators are responsible for preparing future generations to live and learn in a technological world. This requires people to be able to use their collaboration skills to accomplish tasks in a digital environment. However, even though group work is being assigned in many secondary classrooms, collaboration skills are not necessarily being developed because group work does not always require collaboration (Krishnan et al., 2018).

Problem Statement

The problem is that teachers in United States rural mid-Atlantic region public schools have used digital activities for student collaboration; however, it is not known what digital collaboration strategies teachers implement, nor how they perceive students' ability to apply collaboration skills in a digital environment. Within education, lack of collaboration occurring for digital activities may lead to lower than average student achievement on standardized assessments (Hilli, 2020). The research indicates students must be prepared to work collaboratively to be competitive in today's job market. Considering the need for collaboration in 21st century classrooms, researchers have explored how technology has changed and molded collaboration in the classroom. For students to be able to work collaboratively on projects, they need to have access to their own device. The 1:1 initiative is where each student has an electronic device such as a computer or tablet that they can use and store their information (Frazier & Trekles, 2018).

Information gathered from teachers about how students collaborate, and which practices teachers perceive to be effective, could be used to create strategies for other secondary education teachers to use when their students are collaborating using digital activities. The gap in research is that there is minimal research regarding strategies used by secondary teachers to teach students properly regarding collaborating using digital activities. This research may lead to strategies that can be used in secondary classrooms to benefit teachers and students when collaborating.

Purpose of the Study

The purpose of this basic qualitative study was to explore secondary teacher experiences involving implementing digital collaboration strategies and their perceptions of effective digital collaboration implementation of strategies among secondary students. Analysis of teachers' experiences and perceptions of digital collaboration skills and strategies students use to work collaboratively using digital activities may assist students and teachers with learning collaboration skills. Collaboration skills include the ability to listen to others, leadership roles, critical and analytical thinking, and the ability to problem solve (Vance & Smith, 2018). Students can then apply these skills in future education and careers that rely on collaboration skills that involve working on a digital project or activity.

Research Questions

I interviewed secondary education teachers who teach in secondary English, science, and social studies classrooms about their experiences and perceptions regarding students' collaboration skills, such as leadership, analytical and critical thinking, and the

ability to problem solve during digital projects or activities. I addressed the following research questions:

RQ1: What are secondary teachers' experiences in terms of teaching and implementing digital collaboration strategies?

RQ2: How do secondary teachers perceive and describe effective digital collaboration strategies among secondary students?

Conceptual Framework

The conceptual frameworks for the study were Vygotsky's social learning theory and Siemens' connectivism theory. The social learning theory indicates that when cognition is shared between participants, learning occurs (Vygotsky & Kozulin, 1986). Culture affects cognitive development when skillful tutors contribute to students' ability to learn (Crawford, 1996). The social learning theory involves integrating technology by adding technological tools such as visual communications where digital images are manipulated, and videos are created when students are collaborating while working on digital projects or activities (Levine, 2018). Applying this theory and analyzing teachers' experiences and perceptions while students collaborate on digital activities yielded findings that can lead to strategies that can be used to benefit secondary educators and students. Connectivism suggests that students can combine thoughts, theories, and information by using technological devices to contribute to the learning process (Siemens, 2005).

Learners experience something together while using a digital tool for a collaborative project or activity. Shared experiences are cognitively improved by working

together on the digital project or activity while collaborating using visual communication tools (Levine, 2018). Technology that involves visual communication tools help students work collaboratively in a digital learning environment (Zahn, 2017). This learning theory connects to 21st century skills such as critical thinking and communication skills needed by students to be competitive and successful by bringing technology and collaboration into the same environment (Wardani et al., 2019). A more detailed description of the social learning theory is provided in Chapter 2.

Siemens (2005) said learning occurs when individuals work within a network of other individuals where they share knowledge in a social and technologically enhanced environment. Diversity of the network of individuals is a factor that influences learning. There are several principles of connectivism including connecting students with information sources and learning rests in the diversity of those information sources. Decision-making is part of the learning process, which enhances problem-solving skills. A more detailed description of the connectivism theory is provided in Chapter 2.

Vygotsky's social learning theory and Siemens' connectivism theory were appropriate to guide this study because these theories involve how collaboration benefits students while they are working with their peers and different methods used to transmit information which leads to learning. Vygotsky's theory provides a perspective for data analysis in terms of how students collaborate with each other using digital activities. Applying this theory and analyzing teachers' perceptions and experiences while students collaborate using digital activities yielded findings that could lead to researchers compiling strategies that can be used to benefit secondary educators and students.

Siemens' connectivism theory is similar to Vygotsky's social learning theory in that they both involve acknowledging the importance of individuals gaining knowledge by collaborating with other individuals. Both Siemens and Vygotsky's theories explain that the knowledge is gained either by the individuals sharing their knowledge or another resource such as a book or information that is on a website. Vygotsky's social learning theory and Siemen's connectivism theory are foundations in terms of formation of research questions based on secondary teachers' experiences involving teaching and implementing digital collaboration strategies and how they perceive and describe digital collaboration strategies among secondary students where skills needed to collaborate are enriched via the use of technology.

Nature of the Study

In this basic qualitative study, I explored secondary teachers' experiences involving implementing digital collaboration strategies and their perceptions of students' development of digital collaboration skills. The rationale to use a basic qualitative design is to interpret human experiences. The basic qualitative design is appropriate for this study because it provides rich and descriptive information to understand perceptions and experiences of secondary education teachers. Data were collected via semistructured interviews with secondary education teachers who had experience with students collaborating with each other on digital activities or projects. Teachers described what they did and then shared how they believed students' skills were influenced by using those strategies. This may remedy lack of research and knowledge regarding secondary

teachers' perceptions and experiences with students collaborating using digital activities in order to better understand how to help teachers educate students how to collaborate.

Definitions

The following key terms are used in my study. Definitions are provided to clarify terms.

1:1 Initiative: An initiative in which a school or organization purchases enough devices, such as iPads, Android tablets, or laptops, so that each student is able to use them on a daily basis (Francom & Moon, 2018).

Analytical Thinking: Identifying and analyzing effective and efficient methods to solve problems (Amaia, 2017).

Applications: Scripts and their expression in code that creates a program designed for a specific purpose. These scripts and code expressions create clickable icons and shortcuts to connect to a program that completed a predetermined set of actions. These steps are determined by the need of the program and are specific to the task (Oigara & Ferguson, 2020).

Collaboration: Working together to achieve common goals with the purpose of enhancing all participants' learning (Li et al., 2017).

Collaboration Skills: Skills that are beneficial to work together effectively and efficiently, such as communication, active listening, negotiating, persuasion, negotiating, and planning skills (Vance & Smith, 2018; Wardani et al., 2019).

Collaboration Strategies: Strategies that are beneficial to create success in terms of working together such as clearly stating goals of the activity, establishing expectations

for each participant, working with individual and group strengths, fostering open and honest communication, encouraging creativity, sharing knowledge and resources, and celebrating successes (Battaglia & Brooks, 2019; Hill, 2017).

Digital activities: Activities that include a digital format, meaning a computer or tablet screen on a digital enabled device such as an iPad, laptop, or desktop computer (Bilge & Besler, 2018).

Digital collaboration: Working together using digital collaborative technologies.

Digital tools: Devices such as laptops, tablets, and computers, along with applications, software, and hardware such as 3D printers, speakers, monitors, keyboards, and scanners (Herold, 2016).

Google Docs: A free web-based application in which documents can be created, edited, and stored online. Files can be accessed from any computer with an Internet connection and a full-featured Web browser. Google Docs is compatible with most presentation software and word processor applications (Woodrich & Yanan, 2017).

Infrastructure: The basic physical and organizational structures of computing systems in an educational facility (e.g., access points, routers, computer connections, drops) needed for the operation of a computer network (Khan, 2017).

Interactive whiteboard: A large interactive display in the form of a screen. It can either be a standalone touchscreen computer used independently to perform tasks and operations or a connectable apparatus used as a touchpad to control computers from a projector (Low, 2018).

Assumptions

In this research, I made the following assumptions. The first assumption was that teacher participants answered research questions honestly and to their best ability to ensure validity in research. The second assumption was that the teachers involved openly and honestly discussed their collaborative perceptions and experiences in interviews to safeguard authenticity. The last assumption was that secondary teachers accurately described their experiences involving teaching and implanting digital strategies and perceptions and descriptions of effective digital collaboration strategies among secondary students. These assumptions had the capability of impacting the validity of this study.

Scope and Delimitations

This qualitative study was restricted to teachers who teach in secondary education. Elementary schools (pre-K through 5th grade) were excluded from this study. Teachers participating in this study had access to training involving technology use, 1:1 digital devices in the classroom, and experience using collaborative software where students collaborate while working on a digital activity. Secondary Title 1 schools that did not meet these criteria were excluded from this study.

No teacher from schools other than Title 1 secondary schools was permitted to participate in research. Those excluded from this study also included parents and administrators of secondary school students. Chosen schools had 1:1 initiative since it is conducive to digital collaboration. Any school without the proper infrastructure needed for devices to work properly was ineligible.

This study focused on exploring the experiences of secondary teachers, who teach in the rural mid-Atlantic region of the United States' school districts, involving teaching and implementing digital collaboration strategies. Piaget's theory of cognitive development was considered for this research; however, Piaget has little emphasis on sociocultural context and Vygotsky's cognitive development theory has strong sociocultural significance (Devi, 2019). Piaget's theory also focuses more on cognitive development stages rather than Vygotsky's zones of proximal development which incorporates social learning rather than defined stages. Piaget's theory also has a cognitive constructivist base that learning is a mentally internal process where Siemens' connectivism theory works in a social constructivism environment where the learning is a social process (Siemens, 2005). This study focused on how secondary teachers they perceive and describe effective digital collaboration strategies among students in the classroom. These foci were used while applying Vygotsky's social learning theory and Siemens' connectivism theory which have strong emphasis on social cultural context and social constructivism to attain a shared goal.

The transferability of the findings from this study may advise future research on effective strategies needed to teach students how to collaborate in digital environments. This study explains the experiences and perceptions that secondary educators had while working in digital activities and some of the strategies they found to be beneficial when their students were working on an activity in the digital format. This study may also provide insight into what skills may be needed at the elementary level and what skills may be needed at the collegiate level.

Purposive snowball sampling was used to select participant secondary teachers. 13 teachers were chosen to meet saturation for this study. Semistructured interviews involving Zoom as the online video meeting application were detailed, and questions were explained and justified. Data were collected, and interviews were digitally transcribed and securely stored. Data were analyzed in order to determine phrases, patterns, and themes. Eight overarching themes and seven subthemes emerged from the two research questions.

Limitations

Limitations are a part of all research projects and may weaken the integrity of a study (Rahman, 2017). Data saturation was may, so additional use of secondary schools in neighboring school districts across the rural mid-Atlantic region of the United States was not necessary for this study. This limitation was because schools and school districts in the US rural mid-Atlantic region are small. The last limitation was time constraints for participants. This was due to busy schedules people have, which made it difficult to set aside at least one hour of their time.

Significance

Even though there has been research on collaboration support between teachers, there is a lack of research involving students collaborating with other students on digital projects or activities. When preparing for future success in education, it is important to build collaboration skills so they can be applied. The purpose of this basic qualitative study was to explore secondary teacher experiences involving implementing digital collaboration strategies and their perceptions of students' development of digital

collaboration skills. Digital technologies have promoted collaboration skills that are needed in future careers to ultimately benefit students as they move into the workplace. Results of this study may lead to teachers increased understanding of collaboration strategies used to provide students practice in terms of developing their digital collaboration skills. Teachers' experiences and perceptions provided insight regarding teaching of digital collaboration skills and were used to inform teacher training. If students' digital collaboration skills improve, this might lead to positive social change by improving student learning, leading, listening, and communicating as well as improving their career and workforce readiness.

Summary

In this study, I addressed lack of research regarding what secondary education teachers experience and perceive related to skills and strategies of students when they collaborate with other students and are engaged in digital activities. In this basic qualitative study, I explored experiences and perceptions of secondary education teachers from the rural mid-Atlantic region of the US. I used Vygotsky's social learning theory and Siemens' theory of connectivism. This can possibly lead to increased teacher understanding of collaboration strategies used to provide students in order to practice developing their digital collaboration skills.

Chapter 1 included an introduction and background of the study, problem and purpose of research, research questions, conceptual framework, and nature of the study. In Chapter 2, I provide research regarding collaboration skills, including communication, analytical thinking, and problem solving.

Chapter 2: Literature Review

Introduction

The research problem is that it is not known what digital collaboration strategies teachers implement nor how they perceive students' ability to apply collaboration skills in a digital environment. The purpose of this basic qualitative study was to explore secondary teachers' experiences involving implementing digital collaboration strategies and their perceptions of students' development of digital collaboration skills. There is current research that explores collaboration in face-to-face classrooms; however, digital collaboration skills observed and needed in the classroom during a digital activity is lacking in current research. Due to the increase of distance learning and virtual classrooms, this research could be beneficial for planning collaborative digital activities.

This chapter includes literacy research strategies and a comprehensive review of the conceptual frameworks. This is followed by a review of current literature addressing themes within this qualitative study. I analyzed and explained current literature involving secondary teachers' experiences and perceptions of digital collaboration skills and strategies among students. The chapter concludes with a summary of literature and a review of gaps in knowledge involving teachers who work with students learning to collaborate using digital activities.

Literature Search Strategy

This literature review is organized into six sections: the conceptual framework, definitions and explanations of collaboration and digital collaboration as well as secondary classroom collaboration skills and strategies. Searching strategies were used to

conduct the literature review. Google Scholar and Walden University's library databases were used for this research. The databases accessed were Academic Search Complete, ERIC, Education Resources Complete, SAGE Journals, ProQuest, Dissertation and Theses Database, and Thoreau.

In this study, I used the following search terms: *secondary teacher experiences, perceptions of digital collaboration skills and strategies, digital collaboration skills among students, creative thinking skills, critical thinking skills, analytical thinking skills collaboration in education, teamwork in education, cooperation in education, digital activities in education, collaboration in careers, collaboration in society, 21st century skills, 1:1 initiative, classroom technology, digital activities, digital tools, instructional design,* and *multimedia*. Sources were published between 2017 and 2020. After peer-reviewed articles and journals were compiled, citations were used to find pertinent research. Search alerts via Google Scholar were created to ensure the most up-to-date information was available for my research.

Conceptual Framework

The conceptual frameworks of this basic qualitative study were Vygotsky's social learning theory and Siemens' connectivism theory. These theories were used to frame this study because when cognition is shared between participants using digital resources, learning occurs. Vygotsky's social learning theory and Siemens' connectivism theory are based on how collaboration benefits students while they are working with their peers and how different methods used to transmit information led to learning.

Vygotsky's Social Learning Theory

Vygotsky's social learning theory was used to provide a perspective for data analysis regarding how students collaborate with each other using digital activities. Vygotsky's theory is appropriate for this study because the theory is based on how collaboration benefits students while working with someone possessing more abilities or knowledge. Vygotsky's social or cognitive theory has four major components: social interaction where individuals interact to achieve a shared goal, more knowledgeable other (MKO) where another individual who has more knowledge is part of the learning process then, zone of proximal development is the space between what a learner can do without assistance and what a learner can do with another individual that has more knowledge, and learning drives development where the individual learns and that learning drives their cognitive development so they can continue to learn (Nguyen, 2019; Vygotsky & Kozulin, 1986).

The cognitive development of the student first takes place in social settings either with a teacher modeling or a peer assisting with a concept. The student then internalizes new knowledge from the social setting (Nguyen, 2019; Vygotsky & Kozulin, 1986). Community plays a central role in the process of making meaning. Group members should have different levels of ability (Sauers & McLeod, 2018).

Building on the theory of social interaction is Vygotsky's concept of the MKO. Vygotsky and Kozulin (1986) said the MKO could be a peer, teacher, coach, parent, or content expert who simply has more knowledge or more advanced abilities than the student. According to Vygotsky, students collaborate with MKOs to ensure social

interaction leads to learning and internalization of content. The social learning theory suggests that students learn by observing others.

Another concept is the zone of proximal development. The zone of proximal development is a two-stage process that starts with the capacity of the student to learn through scaffolding of the concept. During the first stage, the student is assisted by the MKO. For instance, the teacher may model a strategy to use in mathematics with the student in a social setting. The student then enters stage 2 where he or she then takes what was modeled and begins to process the same concept using the same strategy independently.

Vygotsky and Kozulin (1986) said learning drives development, meaning the student is able to learn by socially interacting with one or more individuals who possesses ability or knowledge beyond what the student has acquired. The learning then leads to internalization of the knowledge and the development of the skills needed to understand the content is achieved (Nguyen, 2019; Vygotsky & Kozulin, 1986). This conclusion that learning develops through social interaction is the underpinning of my study.

Vygotsky's social learning theory was applied to my study by focusing on the collaborative component in Vygotsky's research. Collaboration between a student and another that has either more ability or knowledge is the ideal situation for the achievement of cognitive development. Once the student learns from the more knowledgeable other, they are able to internalize this new knowledge and be able to give evidence of their new understanding (Nguyen, 2019; Vygotsky & Kozulin, 1986). Applying Vygotsky's social learning theory and analyzing the strategies students use in

collaborating on digital activities yielded data that was explored. This research analyzed collaboration skills while looking through the lens of Vygotsky's social learning theory.

Previous research applying Vygotsky's social learning theory covers topics such as: overall learning (Silalahi, 2019), achievement programs (O'Bryan, 2019), mathematics education (Roth, 2020), clinical instruction (Kantar et al., 2020), and coping skills (Shillabeer, 2019). This previous research has several similarities. The similarities start with Vygotsky's zone of proximal development meaning that there is an area in learning where learning can almost be achieved alone but may be achieved with assistance, extending Piaget's perspective on how learning occurs (Roth, 2020). Piaget explains that learning happens as a constructive process that happens when one is alone where Vygotsky explains that learning happens as a constructive process that happens when one is learning in a social environment (Devi, 2019). This is essentially developing someone's learning potential by increasing their socialization and creating relationships with others to learn (Shillabeer, 2019; Silalahi, 2019). The methods used to accomplish this learning designs scaffolding of the lessons using more capable peers as collaborators to blend the learning between the collaborators (O'Bryan, 2019). Using pairing of students in collaborative learning environments supports the development of the students by teaching beyond the student's ability meaning that when putting students in groups where they are no longer independent but will learn together, based on Vygotsky's theory, they will learn beyond what they could alone (Kantar et al., 2020). The current study, to explore secondary teachers' experiences and perceptions of digital collaboration skills and strategies among students, benefits from this framework based on Vygotsky's

emphasis on the collaborative nature of learning by the construction of knowledge through social dialogue.

Siemens' Connectivism Theory

Siemens (2005) said learning occurs when the following happens: it is distributed within a network and is social, it is technologically enhanced, recognized, and patterns are interpreted. Diversity of networks is a factor that influences learning. For example, Google Workplace, formerly known as Google Suite, is a tool that transforms static lesson delivery with game-based activities, formative assessments, and student collaboration to enhance learning experiences on any device.

The history of connectivism goes back to the early 2000's when Siemens (2005) realized that current theories were too limiting to explain how technology is changing our global knowledge base and how to discern which information is important and which is not. This need led to the idea that knowledge exists everywhere, using multiple modalities to convey that knowledge, which can be accessed and organized by the learner (Siemens, 2005). In this study, connectivism theory was used as a lens that is applied using digital tools such the internet.

Technology has become a major component in educational systems (Woodrich & Yanan, 2017). Connectivism integrate technology into learning by bringing the technology into the classroom. This learning uses networks of information, such as the internet, to connect the learner with the information that is available (Waks, 2018). When these networks are used in a collaborative manner, learning can be more effective (Siemens, 2005; Vygotsky & Kozulin, 1986).

There are several principles of connectivism including connecting students with information sources. These sources can include video storage resource such as YouTube and other digital information sources such as museum sites and shared University databases (Dogtiev, 2019). It also indicates decision making as part of the learning process which enhances problem solving skills. This decision-making is part deciding which resources are valid and useful as well as decision that need to be made to achieve shared goals (Siemens, 2005).

Vygotsky's social learning theory and Siemens' connectivism theory are appropriate for this study because these theories are based on how collaboration benefits students while they are working with their peers and how different methods used to transmit information leads to learning. Vygotsky's theory may provide a perspective for data analysis on how students collaborate with each other using digital activities. Applying this theory and analyzing the teachers' perceptions and experiences while students collaborate on digital activities may yield findings that could lead to researchers compiling strategies that can be used to benefit secondary educators and the students. Connectivism is a newly developed theory of learning that started within the blogosphere in 2005 and from there has been and continues to be, developed into a learning theory for the digital age (Siemens, 2005). Moreover, Vygotsky's social learning theory is similar to Siemens connectivism theory in that they both acknowledge the importance of gaining understanding from entities that are more knowledgeable. In Vygotsky's theory it was a peer or teacher and in Siemens' theory it would include the internet. These theories in education show the development of connections as a way to gain knowledge.

Literature Review Related to Key Concepts

I have organized the literature review into subtopics relevant to my research. First of all, collaboration and collaboration skills are needed to be successful in the classroom. Next, 21st century skills are explored due to their importance in the academic world as well has the career field. I also discussed the connection between communication and collaboration as it pertains to digital collaboration. I examined the research on critical and analytical thinking skills as well as collaborative groups and problem-solving skills.

Collaboration and Collaboration Skills

Collaboration is defined as when two or more people work together on a shared goal or task (Vance & Smith, 2018). The construct of collaboration applied to secondary education is to work together to achieve common goals with the purpose of enhancing all participants' learning in a classroom setting (Li et al., 2017). A study by Zarrinabadi and Ebrahimi shows that collaboration has been a necessary part of society since the beginning of time to reach goals (Zarrinabadi & Ebrahimi, 2019). As several researchers have found, collaboration is a key component in society due to the utilization of technology to collaborate on shared tasks (Amaia, 2017; Boyu, 2017; Hill, 2017; Hughes et al., 2018).

A synopsis of current literature reveals that teachers assign group work in school classrooms across the country, but collaboration skills may not be developed (Zarrinabadi & Ebrahimi, 2019). Moreover, most students did not know how to work together effectively (Engeness & Edwards, 2017). This leads this researcher to believe that group work in the school may not mean that students are collaborating. Edwards' research

shows that students in secondary education need to develop communication and collaboration skills to be successful (Engeness & Edwards, 2017). Collectively these studies show that collaboration is an important skill within educational activities. Qualitative research methodologies were applied in the aforementioned research which coincides with my chosen qualitative design. The scope of my study was to focus on the experiences and perceptions of my participants while collaborating as is consistent with this research where the researchers looked for their participants experiences when students work together to learn.

Researchers who have studied collaboration skills have some inherent strengths and weaknesses in their approaches. As discussed above, the research is qualitative in design with the focus being on the experiences and perceptions of the participants. The strengths of this method are that it; is good for examining experiences and feelings towards collaboration, allows in-depth exploration of collaboration, and provides insights into how collaboration can affect learning. Some inherent weaknesses are that; it cannot extrapolate to a much larger population, the volume of the data is limited due to saturation, and the possibility of time-consuming data collection methods (Rahman, 2017; Ravitch & Carl, 2015; Strauss & Corbin, 1990).

Collaboration skills allow an individual to successfully work toward a common goal with others. Collaboration is just one of many skills needed to be successful in future academia, future careers, and being part of society (LaDuca et al., 2019). According to Rahman (2019) collaboration is a necessary 21st-century skill that enable people to accomplish shared goals in diverse teams. This research justifies the rationale for

selecting collaboration as a key concept in the scope of this study. Many theorists have iterated the importance of collaboration skills. According to Dean and East (2019) for society to progress through the 21st century, collaboration is needed for a cohesive and productive world. Therefore, since there is an increase in technology-based instruction in the classroom where the internet and collaborative tools are available for students to use, collaboration becomes even more necessary and important (De Vita et al., 2018). After reviewing and synthesizing these studies a clear description of collaboration has been formed however it also necessitated narrowing the scope of the search of key concepts related to the research questions. The concept of digital collaboration is working together using digital technologies. Products from Google Suites such as Google Docs, Google Slides, Google Sheets and Google Forms as well as products from Microsoft Suite such as Word, Excel and Power Point are used for collaboration to accomplish a common goal or purpose (Heggart & Yoo, 2018). According to White (2018) classified research on classroom activities can take the form of an individual activity, a small group activity, or a large group activity. According to Wardani et al. (2019), even though research explains the needs for skills that enhance collaboration, the need to use these skills during digital activities is significant to prepare students for a future in a competitive global economy. The literature also rationalizes the need to research communication skills.

Collaboration is just one part of the 21st Century skills that are needed for success. According to Androutsos and Brinia (2019), there are many skills needed to be able to collaborate such as being able to competently communicate. Communication skills must be developed and implemented to be successful in a global community

(Vance & Smith, 2018). For this reason, it was selected as a variable within the conceptual framework. Vygotsky believed that language develops from social interactions, for communication purposes. Vygotsky viewed language as man's greatest tool, a means of communicating with the outside world (Sauers & McLeod, 2018). There are several different methods to communicate including but not limited to written and digital correspondence, electronic messages, and presentations either oral or through video (Hughes et al., 2018). The connection between communication and collaboration is strong in that communication skills are needed to be able to collaborate (Vance & Smith, 2018). However, the communication must be developed, signifying that the method of communication must be chosen based on the needs of the individuals involved. If the group has all the criteria, such as infrastructure, experience using differing communication devices, and technological skills, then they can communicate to decide on which is the best method for all involved (Steyn, 2017). This reinforces the need for certain skill sets in society and careers specifically including collaboration skills (Androutsos & Brinia, 2019). All things considered, communication is the efficacy of effective digital communication skills, and it relates to the basic qualitative study exploring secondary teacher experiences and perceptions of digital collaboration skills and strategies among students.

Other elements important to the conceptual framework and scope of the study are critical thinking and analytical thinking. A 21st Century skill, critical thinking involves asking appropriate questions gathering and creatively sorting through relevant information. From a Vygotskian perspective, critical thinking skills are taught through

social interactions between most knowledgeable other, most often the teacher, and the student. Critical thinking skills also incorporate systematic thinking where thinking through a problem step by step is needed. Secondly, effective analyzing and evaluating is needed within the critical thinking skill. The evidence from the reasoning is not only analyzed but also evaluated, to fully understand and start to make some conclusions on what has happened or what the issue is. Next, making connections allows for one to start to fully understand what has happened and begin to plan out the next step. This is usually done in a group with a collaborative goal of coming up with the solution to the problem or situation. These skills are integral to being able to collaborate with others with the shared goal in mind (Turvey & Hayler, 2017). Considering the need for collaboration in a 21st century classroom, research has explored how technology has changed and molded collaboration in the classroom as well as the need for those skills to then be part of business (Pifarré, 2019). Analytical thinking is focusing on what needs to be done, step by step, in an activity (Deringöl, 2019). By analyzing what steps need to be taken by the participants, their creativity is needed to come up with a plan to accomplish the goal of the activity. The purpose of this basic qualitative study was to determine secondary teachers' experiences and perceptions of digital collaboration skills among students. It is important for the teacher to know and understand how their students think these two concepts are important elements in this study.

When the teacher creates their collaborative groups, understanding the thinking skills their students have will help facilitate a successful collaborative activity (Martin, 2019). When applied to collaboration, critical, analytical, and creative thinking skills are

imperative skill to be successful while collaborating. Skills such as communication, thinking skills, and problem solving are meaningful skills in the construct of collaboration.

Creative thinking and problem solving are natural by-products of critical thought. For this reason, creative thinking and problem solving were selected as elements of the phenomenon related to be studied. The scope of this basic qualitative study to explore secondary teacher experiences and perceptions of digital collaboration skills and strategies among students. This approach has been formalized as creative problem solving (CPS). CPS is a method for tackling a problem or a challenge in an imaginative and innovative way (Hardy et al., 2017). The role of creativity in this research is the use of original ideas to accomplish a shared goal.

When students are collaborating, there is a need for them to be creative in the roles they take when working (Harper, 2018; Schmoelz, 2018). These roles range from framing the task they are working on, overcoming technological challenges, engaging in generating shared ideas, making connections within intrasubject ideas, evaluation of ideas, and making these ideas a reality with the shared goal (Pifarré, 2019). According to Puente-Diaz and Cavazos-Arroyo (2019), these roles based on the individual students' creative abilities is facilitated by the teacher to best meet the needs of the students and to ensure success with the activity.

Problem solving skills use analytical thinking to complete a shared goal. According to Rahman (2019) knowledge is not sufficient to make students successful, they need to be able to problem solve in collaborative situations. Therefore, when

students are collaborating on a shared activity there will be decisions that need to be made to complete the task. These decisions are considered problems that need to be surmounted by the students in a collaborative manner. According to Rahman, (2019) there are several steps in problem solving. The first step is to identify the problem that needs to be dealt with and then its causes. After these sessions, students choose the best solution from the brainstorming event. When the best solution is chosen, it is time to implement the plan and evaluate the success or failure of the solution (Rahman, 2019). Creativity in the solutions generated by the students is needed for effective collaboration.

Vygotsky's theory of creative imagination explains that imagination may be used in CPS in art and science (Skorc, 2019). It also discussed a convergence between imagination and thinking in concepts which occurs during adolescence and matures in the creative thinking of the adult. Therefore, this concept is relevant to the conceptual framework of this basic qualitative study due to the connection to Vygotsky's social learning theory.

Collaboration skills are needed in careers so individuals can come together and share information, share responsibilities, and make group decisions where technology is used to connect people. These skills lead to making products, providing services, negotiating deals, coordinating projects, offering advice, and making decisions (Wardani et al., 2019). Globally the technology being used to collaborate is vast and includes the fax machine, pagers, email, instant messaging, mobile phones, text messages, social networking, video conferencing and multiple other devices and platforms to connect people to work together. Pew surveys analyzed the use of these tools, and the following

percentages explain those that stated that these methods are very important to their careers, 61% email, 54% internet, 35% landline phones, 24% mobile technologies, and 4% social networking (Anderson & Jiang, 2020). The career aspect of collaboration is very similar to academia. In academia, all the above devices can also be used to collaborate. Therefore, this demonstrates the importance of collaboration in school so these skills can be learned and applied in diverse and differing situations.

What is known about Vygotsky's social learning theory is that students tend to learn better in a social environment rather than learning alone. Interactions with others while learning a task, working towards a goal, or simply the development of cognition within the zone of proximal development increases the amount an individual can learn despite their genetics (Vygotsky & Kozulin, 1986). On the contrary, Piaget explains that learning happens in stages and individuals cannot learn more than their genetics allows them to learn, even if in collaborative learning groups (Burke, 2020; Wallace, 2020). Vygotsky's ideas and Piaget's ideas do share constructivist structures which means they both feel that knowledge is built upon previously known facts, however, Vygotsky adds the social component to building knowledge where Piaget does not. Vygotsky also feels that working within a social environment they are in continuous cognitive development with no limitations and Piaget explains that there are four discrete stages, and that cognitive development is limited by those stages.

Vygotsky's social learning theory was not without its controversies. Vygotsky argued that in education, students' abilities to solve problems should be assessed and not their acquired knowledge; this is fundamentally different then our current assessment

system (Chaiklin, 2003). This argument has received more criticism since this makes Vygotsky appear overly optimistic in his perceptions of one's abilities. Some further controversies with Vygotsky's ideas are that he does not consider gender in his studies and under emphasizes the individual learner (Feldman & Fowler, 1997). Vygotsky's informal research methods, due to the qualitative nature of his research, cannot be projected to cover large populations (Crawford, 1996). Quantitative research of Vygotsky's ideas may be able to extend his ideas to larger populations and by adding demographics to his research could increase validity and reliability due to the nature of quantitative research rather than qualitative (Crawford, 1996). The lack of current research in the discipline reveals a need to further investigate the skills sets needed for digital collaboration skills through the lens of teachers' experiences and perceptions.

After careful review of the studies closely related to the research questions of this basic qualitative study one would conclude that secondary teachers may assign group work in classrooms across the country, but collaboration skills are essential to being not only a good student but also a productive member of a global society. Conversely, many studies show that collaboration skills including communication, thinking skills, and problem-solving skills are imperative to success in a global technological society. It is not known how secondary teachers from rural mid-Atlantic schools perceive and describe effective digital collaboration strategies among students. It is also not known what experiences and perceptions secondary students have about collaboration skills among students, Given the research questions, a basic qualitative approach was selected as the

most meaningful approach because it involves collecting and analyzing non-numerical data to explore experiences, perceptions, and opinions.

Summary and Conclusions

The purpose of this literature review was to provide background to this basic qualitative study which explored secondary teacher experiences and perceptions of digital collaboration skills and strategies among students. The review of the literature provided insight into the various frameworks applied to collaboration, digital collaboration in the classroom, collaboration skills, communication skills, critical and analytical thinking, problems solving, creativity, and leadership. In this review of digital tools in secondary education and digital collaboration in secondary classrooms were investigated. In this section literature on the social learning theory by Vygotsky and the Connectivism Theory by Siemens were evaluated. Common themes where collaboration is important in secondary education, digital collaboration is increasing in classrooms, collaboration skills need to be taught and practiced in the classroom, there are many digital tools available to students with many new ones being developed, and teachers need to embrace technology to properly implement digital collaboration in the classroom.

I researched teachers' experiences and perceptions of digital collaboration skills and strategies among students. This study filled the gap in research where there was minimal research on secondary teacher experiences and perceptions of collaboration skills and strategies used by their students when collaborating in digital activities. In Chapter 3, I addressed the design and rationale of a qualitative interview study method. I also identified the study population in addition to the procedures for collecting and

analyzing the data. Chapter 3 methodology is consistent with a qualitative study seeking to understand the teachers' experiences and perceptions of collaboration skills and strategies used by their students when collaborating in digital activities.

Chapter 3: Research Method

Introduction

The purpose of this basic qualitative study was to explore secondary teacher experiences involving implementing digital collaboration strategies and their perceptions of students' development of digital collaboration skills. This chapter includes the research design, my role as the researcher, and methodology, followed by a detailed description of participants, instrumentation, and data analysis. Finally, Chapter 3 includes issues of trustworthiness, ethical procedures, and a transitional summary leading to Chapter 4.

Research Design and Rationale

The research questions that guided this study were based on experiences and collaboration strategies of secondary teachers. I addressed the following research questions:

RQ1: What are secondary teachers' experiences in terms of teaching and implementing digital collaboration strategies?

RQ2: How do secondary teachers perceive and describe effective digital collaboration strategies among secondary students?

Merriam and Tisdell (2016) said the purpose of the basic qualitative research method is "to understand how people make sense of their lives and their experiences" (p. 24). Furthermore, for a basic qualitative study, the researcher collects data from peoples' experiences to understand interpretations of those experiences (Merriam & Tisdell, 2016). Basic qualitative studies involve using an inductive strategy to analyze patterns or common themes. A basic qualitative study is descriptive in nature, meaning that the

researcher describes common themes that explain the phenomena (Rahman, 2017; Ravitch & Carl, 2015; Strauss & Corbin, 1990).

The in-depth interview method was used to obtain rich and contextualized information from teachers. Experiences and perceptions of secondary education teachers were used to develop collaborative strategies. Those strategies can then be used to enhance classroom instruction.

Three qualitative designs (phenomenology, grounded theory, and case study) were considered for use in this study. A phenomenological approach involves focusing on individual experiences of the world and interpretations of events (Alase, 2017). The phenomenological approach was not chosen for this study because this study was designed to explore teachers' experiences and perceptions of digital collaboration skills and strategies among students and not the essence of their shared experiences. Moreover, the phenomenological study is suited for studying effective, emotional, and often intense human experiences (Moustakas, 1994). However, this study was used to address strategies and techniques teachers are using in secondary classrooms to facilitate students collaborating using digital tools.

Grounded theory involve generating or discovering a theory for a process or action involving a specific situation (Strauss & Corbin, 1990). This approach was also not chosen for this study. This study involves how teachers perceive and describe effective digital collaboration strategies among secondary students and not theories or processes. Using the grounded theory may generate predictions of experiences, and this

research does not involve predicting experiences but finding themes within secondary teachers' experiences.

A case study is designed to limit bias by collecting accurate data. The data analyzer may choose what to define as a fact and what is not. The case study approach was not chosen due to the chance of turning opinions into facts due to unconscious bias. Case studies also involve focusing on a phenomenon by analyzing data from an individual person, event, or institution. This study involved analyzing multiple secondary teachers across differing institutions to compile data.

Role of the Researcher

For this basic qualitative research, I served as the interviewer who accessed experiences and perceptions of secondary teachers as well as perceptions of digital collaboration skills and strategies among students. As the researcher, I am a human instrument that collects data taking my own biases, assumptions, expectations, and experiences into account and ensuring my ability to collect data with minimal bias. I took more of an etic role since I was a researcher rather than emic.

My role as the sole researcher was to interview participants for this basic qualitative approach with fidelity. I have taught others how to use technology and digital tools in the classroom to engage and teach students. This has been done at secondary and collegiate levels. My experience and expertise gave me a better understanding of potential strategies and techniques teachers use for digital activities. I did not have personal or professional relationships with participants because they were chosen from US rural mid-Atlantic Title I schools outside of my district that met participant selection

criteria. Data were collected outside of my current school building. This was done to avoid supervisory or instructor power over participants.

Methodology

In this section, I explain the methodology used to conduct this research so researchers can replicate this study. Participant selection logic, data instrumentation, procedures for recruitment, participation, and data collection are discussed. Additionally, a data analysis plan involved connection of data to research questions, types of and procedures for coding, and treatment of discrepant cases. This was completed in a credible, transferable, dependable, confirmable, and ethical manner.

Participant Selection Logic

In this basic qualitative study, the population was secondary teachers from U.S. rural mid-Atlantic Title I schools that have a 1:1 digital device initiative where each student has their own device to allow for collaboration and digital activities. The school itself also had to have the proper infrastructure needed for devices to work properly and access to information and digital tools while in the classroom. Purposive snowball sampling was used to select participants and schools for this basic qualitative study. Purposive snowball sampling is a simple and low-cost method that allows for studies to take place when populations may be difficult to attain. Snowball sampling consisted of two steps: the first step was to identify potential participants within the population, and then those participants were asked to recruit other people and until there were sufficient participants to complete the study.

All participants were teachers located in the mid-Atlantic region of the Unites States and teach in secondary classrooms that had access to training involving technology usage and 1:1 digital devices and experience using collaborative software where students collaborate using digital activities. Schools were selected from an approved district that met the requirements of the research problem, purpose, and research questions. To establish how participants are known to meet this criterion, an email communication was sent to the appropriate school district contact person who connected me with the initial volunteer to which the sampling process begins. The initial volunteer assisted with recruiting participants in a snowball sampling method.

Determining the sample size of this study depended on several factors, including the depth and breadth of the research questions, the number of interviews being conducted, and the purpose of the study (Merriam & Tisdell, 2016; Patton, 2015). This study needed ten to twelve for saturation of emergent themes (Dworkin, 2012; Noy, 2008; Strauss & Corbin, 1990). With thirteen in-depth interviews, I was able to explore the individual perceptions and experiences of the teachers to gain rich and abundant data (Legard et al., 2003). The in-depth interview is a common qualitative research technique that utilizes a small number of participants to explore their experiences and perceptions of a particular phenomenon; in this study that phenomena is the teachers' experiences and perceptions of digital collaboration skills and strategies among their students when working on a digital activity (Strauss & Corbin, 1990). The goal of the interview is to gain a detailed picture of the phenomena.

The relationship between saturation and sample size in basic qualitative research is to find the balance between the number of participants and new information being gathered. Data saturation means that data should be collected until there are few or no surprises in the data and no more patterns or themes are emerging from the data (Mason, 2010). Using purposive snowball sampling, 13 participants yielded sufficient data to generate data saturation.

Instrumentation

The data collection instrument used for this qualitative study was an interview protocol created by the researcher. The interview protocol included several items to make sure the content is valid. I used a basic qualitative approach where I conducted semistrutured interviews utilizing Zoom as the online video meeting application. I then had the audio transcribed into text to gain understandings (Patton, 2015).

Interview Protocol

The validity of the interview protocols was addressed by structing my research questions based on Vygotsky's and Siemens theories on social learning with the use of technology to collaboratively work together through the lens of teachers' experiences and perceptions in the secondary classroom. My dissertation committee assisted me in ensuring that my interview protocols and research questions aligned and appropriate for this study.

Collaboration experiences and perceptions in digital activities among secondary education teachers is the primary focus of this qualitative study. Vygotsky's social learning theory and Siemens' connectivism theory influenced the creation of the

interview protocols by sharing cognition between the participants of the study and when that sharing took place, learning occurred. The interviews were also technologically based, using Zoom as a recording platform which coincided with using technology to enhance learning as in Siemen's connectivism theory. The research questions focused on the teacher experiences and perceptions which made the semi-structured interview format ideal since the data would be open-ended and exploration of the participants thoughts were needed to establish trends and themes (Merriam & Tisdell, 2016).

The interview protocols were included in the main questions (see Appendix A) that provide the scaffolding of the interview and follow up questions that explore the interviewer's answers to obtain further depth and detail (Rubin et al., 2020). The follow up questions were used to clarify examples and clarify concepts and themes that are being developed. To ensure sufficiency of the data collection instrument, the interview questions were designed to have open-ended responses rather than simply yes or no responses to allow for deeper exploration of information (Merriam & Tisdell, 2016). I used purposive snowball sampling to obtain my 13 participants which yielded sufficient data to generate data saturation. I created 2 research questions with 13 interview questions to sufficiently address the research questions, as per Merriam & Tisdell (2016). The interview questions were based on the research questions and the conceptual framework of this study.

According to Merriam and Tisdell (2016), there are many benefits to semistructured interviews which have a flexible structure. Semistructured interview questions can be prepared ahead of time to assist with keeping the respondents on topic

and follow up questions during the interview can created and asked during the interview which allows for deeper exploration of the participants experiences and perceptions as well as increasing the validity of the research by having the initial framework established for all participants. A fully structured interview will not allow for deeper exploration of perceptions and experiences of the participants. Since deeper exploration was needed, a pilot study was not conducted due to a pilot study being used to test the design of the study for potential later research and not an in-depth study from the beginning (Dean, 2007). Another benefit of semistructured interviews by encouraging two-way communication are open-ended responses from the participants that are more in-depth in nature so emerging ideas will come forth where more specific questions will not yield the reasons behind the responses and emerging ideas will not be discussed (Merriam & Tisdell, 2016).

The validity of this research was addressed by structuring the research questions based on Vygotsky's and Siemens theories of social learning with the use of technology to collaboratively work together through the lens of teachers' experiences and perceptions in the secondary classroom. Throughout my dissertation process, a panel of experts, my dissertation committee, assisted me in ensuring that my research questions aligned with my study. Using the semistructured interview protocols with the same base interview questions based on the research questions made this research more valid and replicable for future research. By interviewing 13 participants, this research met saturation which achieved sufficiency of data collection to answer the research questions (Noy, 2008).

Table 1

Research and Interview Questions

Research Questions	Interview Questions
Question #1: What are secondary teacher experiences and perceptions of digital collaboration skills among students?	● When your students collaborate in digital activities, which collaboration programs/software do you use and why? Such as Google Suite and/or Microsoft Suite ● What are your experiences and perceptions of student's communication skills while collaborating in digital activities? ● What are your experiences and perceptions of student's critical thinking skills while collaborating in digital activities? ● What are your experiences and perceptions of student's critical thinking skills while collaborating in digital activities? ● What are your experiences and perceptions of student's problem-solving skills while collaborating in digital activities? ● What are your experiences and perceptions of student collaboration strategies in digital activities? a. How are these strategies taught to students? ● What did you learn from these experiences?
Question #2: How do teachers perceive and describe effective digital collaboration strategies among secondary students?	● What are the collaboration skills you feel are most effective when working on digital activities and why? ● Which of these collaboration strategies do you feel are most effective and why?

- What would you consider to be the challenges when students are collaborating in digital activities?
- What would you consider to be the successes when students are collaborating in digital activities?
- What impact do you believe that collaboration in digital activities have on your instructional practices and the learning experiences of your students?

Procedures for Recruitment, Participation, and Data Collection

The procedures used to identify, contact, and recruit the participants are as follows. The first step was to submit the Walden institutional review board (IRB) application for research ethics review. I then started with contacting teachers at public schools in the Unites States rural mid-Atlantic region that have appropriate infrastructure to conduct collaborative digital activities in their secondary classrooms. The contact was an email requesting they take a pre-interview Google Form survey to ensure they meet the study's criteria: they have access to training in technology usage, access to 1:1 digital devices and experience using collaborative software where students collaborate on digital activities (Ravitch & Carl, 2015). I then compiled the teachers that met the criteria and were willing to participate in the study. This snowball sampling met the 10 to 13 voluntary participants for this study. If there were not enough voluntary participants for the study, I would have increased my participant pool range if the school district met the same research criteria.

Once I had the list of participants, I requested final Walden's IRB approval. When final approval was granted from IRB, I contacted the voluntary teacher participants that

met the criteria. The email included information about their participation and their response satisfied the permission requirements from the IRB. I included explanation of the study with the research problem and purpose. I explained that the interview should take approximately one hour. The date, time, and link for the interview, using Zoom as an online video meeting application, were also shared in the email communication.

The day before the scheduled online Zoom meeting, I emailed a friendly reminder with an additional link to the Zoom meeting with the time. The recording started as soon as the session begins using Zoom. I read through the problem and the purpose of the study and asked for any questions the participant may have. I also explained that a summary of the interview will be emailed to them once the study has been completed. I then thanked them for their time and participation in the study and started with the first question. During the interview, I recorded the audio responses as well as taking additional notes that I used to create follow up questions to clarify responses and or ask for more details. It was important that I not interrupt their responses so taking notes was important to follow up with the participant at the appropriate time. When the interview ended, I again thanked them for their time and reminded them that I will send them a summary when the study is over. At that point I ended the audio recording and ended the Zoom meeting.

I used Trint transcribing software to take the recording and transcribe it into text. I then reviewed the text and the recordings to ensure accuracy by making any needed corrections. When accuracy was confirmed, I emailed the transcripts to the teacher participants requesting their approval of the transcript's accuracy. Any needed revisions

were made for final teacher participant approval. The teacher participants than received a copy of the transcripts for their records.

Data Analysis Plan

For this study, I conducted recorded video interviews using Zoom as my primary source of data. The transcripts were coded using NVivo (a QDA software). I examined the transcription from each interview and created a coding scheme that identified keywords and phrases, patterns, and themes (Braun & Clarke, 2006). I used the five steps outlined by Rubin et al. (2020) which is explained within the second edition of The Art of Hearing Data (Dean, 2007). The steps start with organizing the data, organizing the codes made up of words and phrases, building patterns and themes, ensuring reliability, and finalizing possible and plausible explanations from the findings. First, I took an inductive approach by analyzing the experiences discussed in the interviews based on the research questions. Second, the data were organized to analyze the codes using keywords and phrases. The coding of keywords and phrases show patterns that I identified (Braun & Clarke, 2006). The patterns within the data were then organized and explored where those patterns made a broader set of propositions about those patterns called themes (Braun & Clarke, 2006). Third, I reviewed the data and communications from the participants to ensure accuracy. A second review of the transcripts were completed to ensure the codes, patterns, and themes were complete. Lastly, to finalize possible and plausible explanations from the findings, I cross checked my data and reviewed the codes, patterns, and themes derived (Braun & Clarke, 2006).

Discrepant Cases

There were 13 participants in this qualitative research study. The participants provided responses based on the semistructured interview questions. The data were then analyzed and coded. After reviewing the interviews with the participant responses, notes, themes patterns, I concluded that there was no evidence of discrepant cases.

Issues of Trustworthiness

To ensure trustworthiness in qualitative research, researchers reflect on the credibility or internal validity of their research, the transferability or external validity of their research, the dependability of the data, and the confirmability of their research (Amankwaa, 2016; Shenton, 2004). Applying well defined research questions using a consistent and appropriate methodology is key to credibility in qualitative research. To ensure credibility of data gathered I first established a positive relationship with each of the teacher participants. I sent an initial email that introduced myself and explained my study along with the pre-interview Google Form survey to establish if they meet the criteria of the study. After the teacher participants were established and approvals were obtained, I reached back out to the potential participants to schedule the interview, shared the interview protocols, and answered any questions they had. The interview started with an informal discussion about the shared basic information from the pre-interview Google Form survey (Merriam & Tisdell, 2016). I specifically explained the purpose of the study and that their participation was completely voluntary, and they were able to stop at any time (Ravitch & Carl, 2015). I conducted the interview with respect and patience being sure to listen attentively. At the end of the interview, I thanked them for their time and

sharing their experiences with me. Lastly, I member checked to improve accuracy and credibility by emailing the transcribed transcripts to them for review and approval (Ravitch & Carl, 2015).

Credibility

Credibility is the confidence that the research findings are true and realistic. The research questions were based on the purpose of the research and the participants selected were directly aligned with the research questions and the purpose of this study (Amankwaa, 2016; Shenton, 2004; Thomann & Maggetti, 2020). The participants were also evaluated with inclusion criteria that ensures their experiences and background knowledge were appropriate for this research. After the interview's transcription, the transcript was shared with the participants so they would have the opportunity to review and validate the data. The rigorous screening of the participants increased the credibility of this research. Data saturation was met with 13 participants. Data saturation is reached when there is no need for additional participants since the new participants would not yield any new information and further coding is no longer needed (Rahman, 2017; Ravitch & Carl, 2015; Strauss & Corbin, 1990).

Transferability

Transferability relates to how the concepts derived from this research can be applied to other settings. Two strategies used to ensure transferability in this research were providing thick description and purposive sampling (Amankwaa, 2016; Shenton, 2004). I collected highly detailed and precise descriptions from the interviews to allow transferability by the reader. I also used purposive snowball sampling based on very

precise criteria of the school district as well as the teacher to maximize the trustworthiness of the information being analyzed.

Dependability

Dependability in qualitative research means that if someone else followed the procedures from this study, they would arrive at similar results. To ensure dependability in this research, I used the same interview procedures and protocol for each interview, and audit trails (Amankwaa, 2016; Patton, 2015; Shenton, 2004; Strauss & Corbin, 1990). I was consistent on reflecting on my research and the analysis of the data. Lastly, in my interview summaries, I quoted the participants' responses, so the reader may be able to distinguish between my analysis and the empirical findings directly from the participants (Rubin et al., 2020). Taking my notes from the interviews and then transcribing the interviews assisted me in clarifying my notes to reduce biases in my notes (Patton, 2015). Using audit trails helped me to remain objective while collecting data (Shenton, 2004). The audit trails helped me track the creation of the ideas and themes generated from the data that may contradict the finding from the literature review. A summary of each interview was generated and shared with the teacher participants with their specific quotes outlined to differentiate between the empirical findings and my research analysis (Patton, 2015).

Confirmability

In qualitative research, reflexivity is a strategy used to foster confirmability. As qualitative researcher interacts with their research, they take an explicit part of the knowledge being produced. This knowledge includes the subjectivities of the research as

part of the research process. Due to this process, the qualitative researcher needed to continuously reflect on their work throughout the research and analysis to understand how their values, experiences, and identities are influencing the study (Amankwaa, 2016; Shenton, 2004). After each interview, I reflected on my personal knowledge and backgrounds to ensure they did not interfere with the results of the study.

Ethical Procedures

As a researcher, I needed to follow ethical procedures to ensure protection of human subjects. The Office of the Research Ethics and Compliance (OREC) is in charge of ensuring every study affiliated with the Walden University meets their ethical standards. The Institutional Review Board (IRB) application was followed as designed by Walden University. This does include human subject protections and ethical partnerships with sites and usage of scholarly tools. When the IRB application was approved, the participants for the study were recruited following the established protocol.

I am the sole researcher and creator of documents to address ethical concerns related to materials and processes. All communications between the researcher, school district personal, teachers, and any other stakeholders in the research was kept confidential and I used numerical pseudonyms for the participants to ensure confidentiality. I also made sure the participants understood that their participation was voluntary and that they could withdraw at any time.

Ethical concerns, when it comes to data collection and intervention have been eliminated by ensuring transparency of the purpose and procedures of the research from the beginning. The interviews were respectful, without intimidation, and clear from the

beginning (McGrath et al., 2019). I shared all the interview protocols with the approved participants and conducted the interviews in the methods decided on; in this research I chose to use Zoom as the online video meeting application program that was transcribed into text using Trint software. The questions did not deviate from the original protocols and the summaries were shared with the participants. If at any point during the interview process, the participant was reluctant to answer a question, I did not pressure them, and we would have moved on to the next question. If the participant wishes to stop the interview and/or have their information removed from the study, I would have completely deleted any information from that participant so not to do harm to the participant (McGrath et al., 2019). If I did not have enough participants due to participants being removed or withdrawn from the study, I would have continued my recruiting of new participants using the purposive snowballing sampling methodology.

Once all data were collected, the data were treated with the utmost confidentiality. To ensure confidentiality, I used secured files that are password protected for all materials that only the researcher has access to (Kamanzi & Romania, 2019). The participants information remains confidential due to using numerical pseudonyms to identify participants and their responses to the interview questions.

After the study was completed, the information was securely stored with password protection and will be kept for five years. Since I have sole access to the data, I take complete responsibility to ensure the data is secure and I will protect the privacy of the participants. Five years after the final publication of the study, unless I re-analyze the

data at some point in those five years, the data will be deleted (Albine & Korstjens, 2018). This deletion includes all the files related to this research.

Summary

In Chapter 3, I started with the study purpose which was to explore secondary teacher experiences implementing digital collaboration strategies and their perceptions of students' development of digital collaboration skills and a preview of the major sections of the chapter. The research questions were addressed as the guides to the study. The basic qualitative research design and rationale of the study were then explained. Discussion on why the phenomenological approach, the grounded theory approach and a case study approach were not chosen was explained. The role of the researcher was defined and explained with potential biases addressed.

The methodology used for this study was identified and explained. Participation selection logic was explained where the population is secondary teachers from United States rural mid-Atlantic Title I schools that have a 1:1 digital device initiative and each student has their own device to allow for collaboration in a digital activity. The instrumentation of the semistructured interviews utilizing Zoom as the online video meeting application were detailed. The interview protocols with the questions outlined were explained and justified.

The procedures for recruitment, participation and data collection were detailed and explained. Starting with an email to teachers with a Google Form survey to establish the proper participants are acquired. Follow up teacher contacts lead to snowball sampling with thirteen participants recruited, and interviews conducted. Zoom was used

to record the interviews and those interviews were transcribed for data analysis using Trint software. The issues of trustworthiness along with credibility, transferability, dependability, and confirmability were addressed. Lastly, the ethical procedures and concerns were described and addressed.

In Chapter 4, I discuss the study, setting, and demographics. The data collection and data analysis were reported, and evidence of trustworthiness was described, and a summary of the data. Lastly the results are addressed and summarized at the end of Chapter 4.

Chapter 4: Results

Introduction

I explored secondary teachers' experiences involving implementing digital collaboration strategies and perceptions of students' development of digital collaboration skills. In this chapter, I restate the research questions and explain the setting and demographics. Then, I discuss data collection development and data analysis. Last, I provide evidence of trustworthiness, results from research questions, and a summary of data.

The theoretical frameworks for this study were Vygotsky's social learning theory and Siemens' connectivism theory. The following research questions were addressed:

RQ1: What are secondary teachers' experiences in terms of teaching and implementing digital collaboration strategies?

RQ2: How do secondary teachers perceive and describe effective digital collaboration strategies among secondary students?

Setting

Participants chosen for this study were secondary teachers at different public schools in the US rural mid-Atlantic region. They all had access to training involving technology usage and 1:1 digital devices as well as experience using collaborative software where students collaborate using digital activities. Snowball sampling was used to obtain 13 voluntary participants for semistructured interviews. Semistructured interviews were conducted using Zoom and audio recordings of interviews were recorded

using Trint. Participants received participant IDs following the number of interviews in sequence such as P1.

Demographics

In this qualitative study, participants had access to training involving technology usage and 1:1 digital devices as well as experience using collaborative software where students collaborate using digital activities. Participants were from different school districts across the US rural mid-Atlantic region. Participants' demographics that were relevant to the study are provided in Table 2.

Table 2

Participant Demographics

Participant ID	Grade Level Taught	Subject Taught
001	Middle School	Mathematics
003	Middle School	Science
004	Middle School	Language Arts
007	Middle School	Science
008	Middle School	Language Arts
010	Middle School	Special Education
011	Middle School	Mathematics
012	Middle School	Science
013	Middle School	Mathematics
016	Middle School	Science
017	Middle School	Science
018	Middle School	AVID
019	Middle School	Social Studies

Data Collection

Data for this study came from one source. I used semistructured interview questions (see Appendix B) to explore secondary teachers' experiences involving implementing digital collaboration strategies and perceptions of students' development of digital collaboration skills. I collected responses from 13 secondary teacher participants who met criteria.

After receiving approval from Walden University IRB (# 04-08-21-0273480) on April 8, 2021, I began to recruit participants. In Chapter 3, I explained how I recruited participants using online public email addresses and purposive snowball sampling. 30-to-60-minute interviews were conducted using Zoom. Resulting data were transcribed using Trint, manually edited for accuracy, and coded using inductive methods and NVivo. Data were secured, password protected on my computer, and located in a secure Google account.

Data Analysis

I conducted recorded video interviews using Zoom as my primary source of data. Transcripts were coded using NVivo. I examined the transcription from each interview and created a coding scheme that identifies keywords and phrases, patterns, and themes. I used the five steps outlined by Rubin. I organized the data and codes made up of words and phrases, building patterns and themes, ensuring reliability, and addressing findings. First, I took an inductive approach by analyzing experiences discussed in interviews based on research questions. Second, data were organized to analyze codes using keywords and phrases. Coding of keywords and phrases showed patterns that I identified.

Patterns within the data were then organized and I explored those patterns to make a broader set of propositions about those patterns called themes. Third, I reviewed data and communications from participants to ensure accuracy. A second review of transcripts were completed to ensure codes, patterns, and themes were complete. Last, to finalize findings, I cross checked my data and reviewed codes, patterns, and themes.

Emerging themes were then compiled into a table that assisted in exploring and organizing my findings (see Table 2). There were no discrepant cases that needed to be addressed.

Table 3

Emergent Themes from Research Questions

Research questions	Emerging themes	Subthemes
RQ1: What are secondary teacher experiences and perceptions of digital collaboration skills among students?	1- Technology Accessibility 2- Communication Skills 3- Leadership Skills 4- Critical Thinking Skills 5- Problem Solving Skills	1a- Student Technological Needs 2a- Student Engagement 2b- Student Personality 5a- Student Proficiency
RQ2: How do teachers perceive and describe effective digital collaboration strategies among secondary students?	1- Collaboration skills and strategies 2- Collaboration challenges and successes 3- Instructional practice impact	2a- Student Distractions 2b- Student Success 2c- Student Engagement and Experience

Evidence of Trustworthiness

To ensure trustworthiness, I reflected on credibility, internal validity, transferability, external validity, dependability of data, and confirmability of research. I applied research questions using a consistent and appropriate methodology which is

necessary for credibility of qualitative research. To ensure credibility of data, I first established positive relationships with participants. I sent initial emails that introduced myself and explained my study along with the pre interview Google Form survey to establish if they met criteria of the study. After teacher participants were approved, I communicated with potential participants to schedule interviews, share interview protocols, and answer questions. Interviews started with an informal discussion about shared basic information from the pre-interview Google Form survey. I specifically explained the purpose of the study and their voluntary participation. I conducted interviews with respect and patience and made sure to listen attentively. At the end of each interview, I thanked participants for their time and sharing their experiences. I used member checking to improve accuracy and credibility by emailing transcripts to participants for approval before data were analyzed and published. When revisions were complete, I also emailed them a summary for their records.

Credibility

Credibility was established by ensuring that the participant selection was aligned with the research questions and the purpose of this study (Amankwaa, 2016; Shenton, 2004; Thomann & Maggetti, 2020). I collected data from 13 secondary education teachers from United States rural mid-Atlantic Title I schools that had 1:1 digital device initiative where each student had their own device. These criteria ensured that their experiences and background knowledge was appropriate for this research. Before the interview, I made initial contact with the participants by email and telephone conversations to establish familiarity with the participants. I also shared the transcribed

interviews to the participants to ensure the correct data was collected. Through email, I communicated with the participants to confirm findings and authenticate the data collected. This thorough examination of the transcripts by the participants increased the credibility of this research by ensuring all data was correctly taken and the transcripts were accurate based on that data (Amankwaa, 2016; Shenton, 2004; Thomas & Maggetti, 2020).

Transferability

Transferability relates to how the concepts derived from this research can be applied to other settings. In-depth descriptions and purposive snowball sampling were two of the strategies used to ensure transferability in this research (Amankwaa, 2016; Shenton, 2004). The purposive snowball sampling was used to meet the research criteria for the participants and the school districts. To ensure transferability to the reader of this research, I compiled comprehensive and thorough descriptions of secondary teachers' experiences and perceptions of digital collaboration skills from the interviews to allow transferability.

Dependability

Dependability in qualitative research means that if someone else followed the procedures from this study, they would arrive at similar results. To ensure dependability, I used the same interview procedures and protocol for each interview, and audit trails (Amankwaa, 2016; Patton, 2015; Shenton, 2004; Strauss & Corbin, 1990). I was consistent on reflecting on my research and the analysis of the data. Lastly, in my interview summaries, I quoted the participants' responses so the reader would be able to

distinguish between my analysis and the empirical findings directly from the participants (Rubin, et al., 2020). Taking my notes from the interviews and then transcribing the interviews, assisted me in clarifying my notes to reduce biases in them (Patton, 2015). Using audit trails helped me to remain objective while collecting data (Shenton, 2004). The audit trails helped me track the creation of the ideas and themes generated from the data that may contradict the finding from the literature review. A summary of each interview was generated and shared with the teacher participants with their specific quotes outlined to differentiate between the empirical findings and my research analysis (Patton, 2015).

Confirmability

I used the reflexivity strategy to ensure confirmability in this study. I examined my own judgments, practices, and belief systems during the data collection process. I was sure not to take any implicit data by asking to follow up questions to gain clarification to ensure that only explicit data is used. I continually reflected on my own thoughts and beliefs during the interview questioning and ensuring that I did not allow any of my own judgments, practices, or beliefs during the data collection or analysis process. My values, experiences, and identities have not influenced the study (Amankwaa, 2016; Shenton, 2004).

Results

This section is designed to present the findings in a logical manner based on the research questions. The 13 participants responded to the questions and coding was used to analyze their responses. Their responses yielded patterns which lead to themes and

subthemes emerging. The themes and subthemes are explained below based on the analysis of the research questions.

RQ1

RQ1 was: What are secondary teachers' experiences and perceptions involving digital collaboration skills among students? Five themes emerged from the semistructured interview of 13 participants: technology accessibility, communication skills, leadership skills, critical thinking skills, and problem-solving skills.

Theme 1: Technology Accessibility

The 13 participants that were interviewed described the technological applications and programs that they have experienced in their classrooms and their perceptions of those applications being used to collaborate digitally. Focusing on digital applications, every participant is currently using the Google Suite of software. Specifically, they are using Google Docs for word processing, Google Slides for presentations, and Google Sheets for spreadsheets.

All the participants concluded that Google Suite's built-in collaborative tools made them beneficial for collaborating, participant 001 discussed that "Google allows me to comment on their document with immediate feedback, sometimes when they are currently writing in it, and it immediately helps them complete the work without having to raise their hand or missing something."

Participant 003 and 004 explained that they use Google because it is "easy for the students to use, they are familiar with it, and they are able to navigate it easily." Participant 007 stated "I like using Google when they are working with each other. They

can type to each other using the chat features in Google." Participant 008 stated: "Our school district dictates what we can use, and they want us to use Google Suite. Specifically, we use Google Docs and Google Slides. When we use Google Suite, the students tend to use the communication features to chat socially rather than for working collaboratively. It seems to be more of a distraction then a benefit."

Participant 011 stated "The main platform that we use in the Google platform, and I am stuck using it since that is what the district is providing us. Some people love Google stuff but I don't but that is what we have so that is what I am using." Participant 012 stated "I mostly use Google for teaching purposes. I don't use the Google features for interactivity but more for presenting. I use other interactive programs and put them into the Google presentation, like a PDF in Notability." Participant 013 stated "The students use Google Slides to create presentations together. I use Google Docs to organize materials but not to teach with."

Participant 016 stated "We just use the Google Suite in my classroom to organize my presentations. We use Google because we were told to by the district." Participant 017 stated "I utilize Google Sheets from time to time and other Google Suite stuff to collaborate in. We use Google Slides a little bit." Participant 018 stated "The students are more familiar with Google, and it is easy for them to navigate. I can communicate and give comments through Google to the students, and I like that."

Subtheme 1a: Student Technological Needs. All the participants discussed that the students need technological skills to be able to collaborate in digital activities. They need to use software that has a collaborative tool that they can use and know how to use.

Of the participants interviewed, the consensus was that they felt that Google Suite worked well to collaborate since they could be working digitally together in the same room or at different locations and still be able to communicate with each other while working on the same activity at the same time, participant 001 stated “I have tried many collaborative apps, but the biggest student buy in, since it is easy to use, has been Google, so we have stuck with that one for collaboration.” Participant 003 stated” The chat is used in Google to let the students speak back and forth. This works well when they are not in the same room at the same time.” Participant 004 stated “Google is a user-friendly program that allows the students to collaborate and to allow me to collaborate with them.” Participant 007 stated “They can work in groups using Google, it’s kind of like the breakout rooms in Zoom.” Participant 010 stated “Collaborating in Google while in the classroom works better than when they are collaborating in different locations. It is better when they are collaborating at the same time so they can get immediate feedback from their partner or teacher and Google Suite does this.

Participant 011 stated “Google is easy for the students to navigate and use as well as being a great tool to collaborate.” The chat function can be used by anyone that has access to that activity. Links can be embedded in the chat function to help the student.” Participant 012 stated “Most students are visual and like to talk so using Google they can visually learn and work together. They are typing instead of talking so they are collaborating.” Participant 013 stated ”We are trying to go into the digital realm because society deems it necessary and Google has met that need with their collaborative tools that can be used in person, face-to-face, or in a digital environment.”

Participant 017 stated “I use Google’s collaborative tools to complete group projects. The students can collaborate together in the classroom or at home at the same time. They can work together in their group projects. Google’s collaborative tools like the chat feature or just being able to work on the same document at the same time, even in different locations, helps them complete those projects.” Participant 019 stated “We collaborate by sharing the work back and forth and commenting as we go. The students work together in the document, I can add my thoughts or links into the document that they can all see, and this can be done in live time or when they log back in, they can see the comments. Google makes this interaction pretty easy.”

Theme 2: Communication Skills

The 13 participants that were interviewed described the communication skills that they have experienced in their classrooms and their perceptions of those skills being used to collaborate digitally. The consensus of all the participants was that communication is important for collaboration. Without the ability to communicate with either the teacher or the other students, there is no collaboration happening, participant 001 stated “I have to say that I have not been overly impressed with their communication skills. They will communicate to the prompt, and they will communicate with me but during a breakout room or a chat within a document or discussion board, they’re not legitimately communication past a shallow level with one another.

They are going through the motions because that is what is expected but I do not see meaningful engagement which is not getting the benefits of that collaboration.” Participant 003 stated “Communication skills are poor. If the kids are interested in

something, they would rather text each other but if it is something they are not interested in, they struggle to communicate. In school, they do not want to communicate 1:1. Even after I give comments on their work in Google, there is nothing back from them. There is no interaction or collaboration." Participant 004 stated "Their communication skills are a little bit lacking right now and I don't know if it is because they are interacting with less people now. When we use breakout rooms for them to communicate with each other I will pop in and some of the groups are complexly silent where others have assigned their own roles and they are collaborating well. So, I think sometimes with their collaboration in digital activity, their communication skills, at least for like traditional communication, talking, sharing, are a little bit lacking."

Participant 007 stated "When communicating, they like to text-talk rather than speak out loud. When we work in a Zoom, they would rather type into the chat box rather than unmute and speak to each other. They have a hard time communicating exactly what they want to say. They think you can understand what they mean if they type the bare minimum, they're like, oh well, that's what I meant. Well, that isn't what you typed so I don't know. So, they are not great at explaining what they want to say to the rest of the group."

Participant 008 stated "The kids communicate socially. They do not necessarily communicate based on that the task is that's given. Students tend to communicate in an abbreviated way, kind of a code. If they are engaged in the assignment and wanted to get things done, they communicate and they stay on task but if you have a lot of students, they will disengage and just sit and not communicate. By the time the task is done, they

are still sitting in the background not communicating or collaborating." Participant 010 stated "Ok, when they are in a digital activity, face to face, they communicate better than if the students are not together. They can still work in Google Slides or whatever in the same classroom or at the same time, they do a lot better when they are in the same room. If they do not have the immediate feedback from the teacher or the other student, they struggle more.

The communication needs to be immediate and ideally in person. Their need for assistance or their need for feedback is much better when we are present with them rather than trying to assist digitally." Participant 011 stated "Immediate feedback, especially in math is needed so they know if they are getting it or not. So, teacher communication is needed right then. Some curriculums help foster good communication for the kids where it has back and forth discussion built in. It is important for all the teachers to use communication tools to help prepare the kids to communicate." Participant 012 stated "Nothing beats a good conversation. A video can communicate the content to the student just like a conversation. Then the students goes back and communicates what was communicated and discussed it or highlights the key words and points. I think groups should be two or three students because if you have more than three somebody does not speak up."

Participant 013 stated "Their communication skills are best when it is direct. To collaborate, you need a discussion. On a message board, I am trying to get them to interact with text, but they do not interact at all but if I message them directly, they will

100% respond to me and engage in a fairly sophisticated dialogue with text but not on the message board."

Participant 016 stated "Using our curriculum, our students work together on digital simulations, and they are supposed to discuss what they are seeing in the simulation. If this is verbal or in text, they need the vocabulary to be able to communicate what they are seeing. Sentence starters with the vocabulary words will also help. So, the kid basically has to be taught how to communicate at a level that is academic to be able to work together." Participant 017 stated "The communication skills of my students are on a spectrum. I have students that have cameras on, do a lot of body language, heads are up, and they are willing speakers, so they are successful. I have others that will not engage, chat either verbally or textually, and they are not successful."

Participant 018 stated "Communication for me, since I teach three different secondary grade levels, gets better as they get older. I have to help the younger grades more than the older grades." Participant 019 stated "Listening to the teacher, listening to each other, and listening to what is actually being said is so important to be able to communicate and collaborate."

Subtheme 2a: Student Engagement. Several of the participants explained that communication equals engagement that equals success in the activity they are working on. They feel that without communication in either written or verbal form means that the student is not engaged and is not learning, participant 001 and 011 explained that "Success is when they work on the activity together while communicating wither by talking or typing while staying engaged. Communication increases engagement because

to engage in of itself is the willingness to engage." Participant 017 stated "When I am checking for communication, I am really checking for engagement. Engagement in the activity leads to open communication which results in success."

Subtheme 2b: Student personality. Another participant felt that introverted students are sometimes more successful. Participant 004 stated "If a student is introverted when working digitally and collaboratively, they struggle communicating digitally, they can still be successful when completing the digital activity." Two participants felt that introverted students communicated better on digital activities since they could think about their response then type their response before hitting submit, participant 003 and 018 suggested "An introverted student has the ability to speak their mind a bit more in a digital environment. Introverted students do better in the digital realm rather than face to face. Having the ability to collaborate digitally can reach both introverted and extroverted students. Introverts excel when using the chat function in Google Suite or other digital tools."

Theme 3: Leadership Skills

The 13 participants that were interviewed described the leadership skills that they have experienced in their classrooms and their perceptions of those skills being used to collaborate digitally. All the participants agreed that leadership is an important student skill when collaborating. If there is no leadership either designed into the activity or someone is not willing to take that role, then very little collaboration will occur, participant 001 stated "Students are still trying to figure themselves out and their relationship to their peers. So, taking a step towards the leader can be very difficult.

Conversely, when someone does take complete control then collaboration is gone, and everyone just puts in their part rather than collaborating on it. I would say the collaboration skill that I see most effective is a balanced leadership. You do not need somebody who is going to 100% say that this is what we do, but somebody who's willing to guide the conversation to say, here is our goal and talk with the people to made decisions moving forward."

Participant 003 stated "There is not enough leadership, and this is something that the students really need to work on. Self-advocacy, I think lends itself to leadership which is important when you are collaborating." Participant 007 stated "The students need to have a relationship with each other. You cannot just throw a group of students that do not know each other into a group and expect them to collaborate. They need to have a level of comfort. Sometimes having their friends in a group help and sometimes it hurts. They need to be comfortable enough to feel confident enough to take part so they can collaborate and lead."

Participant 010 stated "My students all have IEPs, so I need to direct them on what to do. I structure my lessons, so the students know what to do and how to do it in the group setting. We are working on those skills for them to be able to work together." Participant 011 stated "The teacher has to teach the student how to be a leader by first telling them they need to be the leader. Then they teach how to communicate, use proper language, and use the chat and so on." Participant 012 stated "Students need to show their work to the group to share what they know. Then they work together again, and that

student is in charge of that smaller group, and they take that role seriously to be successful."

Participant 013 stated "Ok, here is a math problem and I want you to go on a digital whiteboard and figure it out. My higher order students will jump in, and they will make it work. But the majority of the students will need to have roles assigned to them. You are the leader, you are the recorder, and so on. These roles need to 100% be taught. Very few will take leadership on their own." Participant 016 stated "Students need to feel that they have something to offer so they have to be built up with their self-esteem before being put into that group where they contribute. They need to be given positive reinforcement. They also have to advocate for themselves and be self-empowered when somebody is not pulling their own weight." Participant 017 stated "Lack of leadership will lead to silence. Leadership is needed by way of the student more then by the teacher."

Participant 018 stated "Self-advocacy lends itself to leadership. If you are not saying anything and speaking up and being part of the group digitally you can really get lost. You can really sneak away." A participant went on to explain that students that are self-advocates are likely to become the leaders in an activity that does not have pre-designed roles, participant 012 stated "Self-advocacy in collaboration lends yourself to leadership. This balanced leadership is needed to collaborate, someone is needed to guide the conversation and make decisions based on that conversation."

Theme 4: Critical Thinking Skills

The 13 participants that were interviewed described the critical thinking skills that they have experienced in their classrooms and their perceptions of those skills being used to collaborate digitally. All 13 participants felt that critical thinking has to be taught and modeled to be effective. Based on 12 of the 13 participant experiences and perceptions, most secondary students have critical thinking skills. Participants 003 and 004 feel that with increased digital activity usage in the classroom, critical thinking has improved, participant 001 stated "All the critical thinking in the world depends on, what I've seen, as somebody actually organizing if for people.

Unfortunately, it seems to be drawn from hierarchical groups that want somebody to tell them what to do and that is it. When people are faced with too many decisions, they can't think of what to do." Participant 003 stated "The teacher knowing the students and the students being comfortable actually helps them to critically think because critical thinking is hard. They often want the easy way out and they will just sit there until someone else solves the problem for them. The critical thinking overlaps with communication because they may be thinking critically but unable to communicate it. They get stuck on how to say it. I think in my class, my critical thinking level, their skills have gone up a little bit because they have the opportunity to express their feeling, ideas, thoughts, and options without someone staring right in your face."

Participant 004 stated "Critical thinking has increased due to the ability to type thoughts and opinions rather than verbally discussing in a face-to-face classroom." Participant 007 stated "So, for critical thinking, kids don't like to do things step by step,

they just want to get to the end. So, when they have to, like, go through a lab activity which is step by step and explain what happened, they just explain the end result. They don't necessarily explain how they got to that result if it is not already laid out for them step by step. So, I break up the question into those steps that they can then answer, they are not apt to do that on their own."

Participant 008 stated "The key to critical thinking is modeling. I kind of feel like what you are looking for in the assignment is based in the instructions. Critical thinking is a step-by-step process that they cannot get to unless modeled. When they cannot get there, they will bow out and not even try."

Participant 010 stated "Well, I think when they are working together, they are critically thinking. What ends up happening is that they sometimes hit a snag in something, whether it be the digital format or something else, then they get a little hung up, so it is like hitting a wall. Rather this bump should just be a bump and not something that stops them. That is where the critical thinking is needed. They may feel uncomfortable and simply not know what to do. We need to structure this so they know how to get help so they can continue."

Participant 011 stated "I feel that my students are all over the spectrum when it comes to critical thinking. Some students answer all the questions that are designed to be higher order of thinking and others are just going through the motions and others are not engaged at all. It is more difficult to see the critical thinking in a digital activity since I cannot see them doing it and I am not interacting with them face to face but rather in a

chat or message board. The question structure has to help with the higher order of thinking."

Participant 012 stated "Critical thinking has to be taught no matter if it's on paper or digital. You have to teach critical thinking, not just ask to critically think. Questions have to be asked all along the way that models critical thinking. The questions guide the critical thinking. Critical thinking can also be taught during a discussion, person to person or in a discussion board. Groups of 2 to 3 are best so everyone participates."

Participant 013 stated "I think, when it comes to critical thinking in a digital environment, there are two different kinds of kids. There are the kids that sort of keep at it and will end up with some critical thinking so they can finish it; they will find a way. Then there are the kids that will do it as the questions guide and if they don't understand or if it requires more thought they will abandon it. The critical thinking has to be encouraged and expected." Participant 016 stated "Critical thinking has to be scaffolded and chunked by explaining what has to be done first, second, and so on. Most students are not able to just jump in and scaffold themselves; maybe 2 out of 20 can. Ok, so I have found that I have to model critical thinking. If I give them a task, I will model it for a few months and then often with my higher students I will not have to scaffold any further. The other students may need additional time to make revisions and alterations with sufficient resources and time to complete."

Participant 017 stated "In my experiences, my students try too simply everything. This is even more so since we have so much technology in the classroom now. The students feel that the answer must be short and easy. Their work then lacks the rigor that

is needed for critical thinking. An example is in our current unit, the question asks what happened to the snow that is now gone; their response is it melted. That response is too simplified, but the curriculum doesn't really make it much more in depth. So, the curriculum has to have questions that foster critical thinking, and those responses need to be modeled."

Participant 018 stated "For critical thinking skills, I think I have leaders who critically think. Those leaders' model those critical thinking skills; the teacher has to too. The students and the teachers also need to have personal connections before the learning of the content can happen so they feel that they fit in and can share." Participant 019 stated "There is no critical thinking happening in the classroom, especially when using technology. They are not thinking outside the box, they are not thinking cause and effect, they are just focused on the fastest answer and the final grade. They are not concerned about the process to get done. The curriculum has to use questions that meet those needs, or they will not happen."

Theme 5: Problem Solving Skills

The 13 participants that were interviewed described the problem-solving skills that they have experienced in their classrooms and their perceptions of those skills being used to collaborate digitally. All the participants felt that problem solving skills are related to critical thinking skills, but it can be separated by technology concerns and collaboration concerns.

Participant 001 stated "Problem solving often does not even extend to asking the teacher what to do next. I see very little problem solving from student to student. I see

problem solving being one student saying here is the answer because I knew how to do it and the other students just copy it and move on. Problem solving needs to be organized for people to be able to collaborate.

Participant 003 stated “Problem solving skills are the ones we are looking at specifically to be able to collaborate. Critical thinking and problem-solving skills run hand and hand. The problem-solving skills are more when we run into a technology issue, or something goes wrong, and we need to solve it to move on.”

Participant 004 stated “For my virtual students, I feel that problem solving has greatly slowed. It is more difficult for them to learn in the virtual environment so problem solving falls off. I think one of the biggest issues with problem solving is that students that are comfortable with the technology can problem solve without asking for help and they can also support their peers and even the teacher at times to problem solve technology issues but those who are not comfortable do not ask for help from their peers or teachers and just fall behind.”

Participant 007 stated “Some problem solving involves getting me, the teacher, into the activity so I can help solve wither the technological issues or the interpersonal issues of the students. They do use the chat to quietly contact me to help. Many times, if something does not work, rather than trying to solve the issue, they will just not do it and blame the technology. For example: when a YouTube video does not load, instead of searching for it through Google they just don’t do it.” Participant 008 stated “Problem solving covers a few different lenses. One is that my PDF won’t load, another is the video did not load, and other is that the person I am working with is not helping. Home life can

also be a problem for example, I am working on my project at 2:00 AM and no one can help me at home and the teacher will not respond until much later. Those kinds of problem-solving skills are needed digitally versus the literal critical thinking skills needed for content."

Participant 010 stated "They are very good at problem solving when it comes to texting and social media but not so much when working on schoolwork. Problem solving when communicating is an issue since they can't spell, or grammar is incorrect, or they are trying to abbreviate their words. They start to feel overwhelmed if they don't have guidance and they shut down."

Participant 011 stated "I think kids have come a long way with problem solving skills. I explain that these skills will benefit them when they are older. To be an independent learner, even when collaborating, they need to problem solve when something goes wrong. They have learned to find creative ways to get the job done. Some of this has been taught and modeled and some has been forced. We need to be consistent and not just throw our hands up when problems arise."

Participant 012 stated "I think that working in a digital environment makes it difficult to problem solve. I don't think the student is engaged enough to make them want to problem solve through any issues that they have. Participant 013 stated "There are two types of kids in my experiences; the one that sticks to it and the one that quits. The ones that stick to it are good problem solvers and the others are not good problem solvers. A lot of the issue is just persevering and not giving up." Participant 016 stated "I find myself saying that it is ok to not know how to do something and it is ok to try and figure

it out. I share that with my students. Because your high kids are not ok with ambiguity, so you have to calm them down and the lower kids don't even want to think so you need to engage them."

Participant 017 stated "The curriculum needs to build in problem solving skills right in the lessons. I try to increase the rigor of the curriculum to include problem solving. Problem solving skill building needs to be built into the teaching." Participant 018 stated "For my students, when they are stuck, they definitely speak up, you know, and it is more than 1. I do have other students that will just put their hands in their laps and do nothing if it does not work the way they think it should or it becomes too complicated they won't problem solve through it." Participant 019 stated "Yes, problem solving needs to be taught. Even though they say that teaching them is old school it is necessary for them to be able to collaborate and get work done."

Subtheme 5a: Student Proficiency. Participant 001, 003, and 012 explained that when it comes to technology, they find that the students are proficient. "The students are able to figure out what is wrong with the computer, tablet, or program often before many others can." Participant 001 stated" Sometimes I ask them how to fix an issue I am having with the device or program. I will have one or two students in each class that are my go-to students that I will send the other students to if they need technical support. They are true problem solvers." Participant 003 stated "Technology problem solving skills are pretty good. The problem solving is more of the technology stuff that they can help with." Participant 012 stated "In smaller groups they can problem solve together when there is a technology issue."

RQ2

RQ2 was: How do teachers perceive and describe effective digital collaboration strategies among secondary students? Three themes emerged from the semistructured interviews of 13 participants: collaboration skills and strategies, collaboration challenges and successes, and instructional practice impact.

Theme 1: Collaboration Skills and Strategies

The 13 participants that were interviewed described their perceptions on collaboration skills and strategies needed to be effective when working on digital activities. Several of the participants felt that the students need to feel safe or comfortable in the class to be able to collaborate. Participant 001, 003, 008, 013, and 019 explained that “they need to feel safe and comfortable in their environment will help them feel confident and free to collaborate, otherwise they are not going to participate or collaborate.”

The strategy from these participants is to ensure that the students have a safe and comfortable environment where they feel safe to share their thoughts and ideas without being negatively criticized.

Several of the participants explained that assigning roles to the students would increase the effectiveness of their collaboration on the digital activity. Participant 007 and 008 explained that by assigning group roles to people would be helpful so they know what to do. This way “they have a job to do, and this will help with them working together.”

The strategy from these participants is to assign the students their own roles with specific instructions to what that role should do. This will structure their work so they may feel confident in their input.

Modeling how to collaborate was addressed by several of the participants. Participant 010 stated "I have to model how to collaborate while I am working with them on the digital activity. The students lack experience in collaborating and I have to help them learn how to collaborate by modeling it with them in the activity itself. Similarly, participant 011 stated that the students do not know how to collaborate digitally and need to be shown how to do it; either by assigning roles or demonstrating." Participant 017 and participant 019 similarly stated that "the students' needs everything there for them, so they can check it off as they go; this will lead to effective collaboration on digital activities." The strategy from these participants address the need to model and educate how to collaborate in digital activities. By interacting and modeling with the students on the digital activity, models the expectation on how to collaborate.

Theme 2: Collaboration Challenges and Successes

The 13 participants that were interviewed described their perceptions on collaboration challenges and success when working on digital activities. Focusing on the challenges, all of the participants addressed the need for engagement by the students to be successful. This was referred to as "buy in" by participant 001 and "motivation" by participant 004 and 007. Participant 001 stated "The students have to buy into the work. This is the same as in the physical classroom where they need to want to do well to do well. This is even more apparent in a digital activity since they can hide easily, especially

if there are multiple people working in the same activity. They just need to log into the activity and try to collaborate."

Subtheme 2a: Student Distractions. Similarity, participants 004, 007, 011, and 013 address the need to remove distractions to be able to increase engagement. These distractions include other duties such as baby sitting or helping with siblings or even other adults in the household. Participant 003 stated "Access to help at home is key when trying to get them to engage. If they do not know how something works or how to get the information, there isn't anyone at home to ask or those that are at home do not know how to help. The students also may be competing with someone who is too engaged and dominates the conversation within the digital activity." Several of the participants expressed that behavior also creates challenges for the students. Participants 008, 010, and 012 experience off task behavior such as not engaging, not turning on the camera, not responding when directly asked, and lack of concern for learning.

Subtheme 2b: Student Success. Focusing on the success, all of the participants addressed that there are successes for many students when collaborating on digital activities. Several participants expressed that introverted student made gains in digital activities rather than in a face-to-face activity. Participants 003 stated "A student that is an introvert, like me, kind of opens up in a digital activity. I feel safer when I am not in person with others. I can be more of myself and think through what I am typing rather than trying to verbalize it in the classroom." Participant 004 stated "Students that are introverted by nature seem to flourish in the digital environment because they can comment on things with far less fear of being rejected in conversations." Participant 011

stated “Rather than using the audio feature while working, my introverted students tend to like to use the chat function and they communicate far more when they type then when they are working in person. They do a really nice job!” Participant 018 stated “If the student has more of an introverted personality, they tend to speak their mind more because they are not talking one-on-one. They are talking with their fingertips and not their mouths. In the classroom, I tend to lose the introverts over the extroverts but on a digital activity, they tend to shine.”

Subtheme 2c Student Engagement and Experience. When a student engages and experiences success in the digital activity, their engagement and collaboration increase. Participant 003, 004, 011, 016, 107, 018, and 019 explained that when the students use the resources available to them, as designed, “they will be successful.” Once they are successful, they will use more of the resources to become more successful. This led to them learning how to communicate effectively since they want to share their success and that success makes them and their peers happy.

Theme 3: Instructional Practice Impact

The 13 participants that were interviewed described their perceptions on the impact collaboration on digital activities has on their instructional practices. All of the participants explained that the activities must have explicit directions to ensure collaborative success. Participant 001 stated that “step by step instructions are needed, especially helpful to the students and the parents if those directions are in video form.” This is also beneficial to students that are absent or just need extra help.” Participant 003 stated “The activities need to be step by step which means I need to slow down as a

teacher and make sure everything is aligned. I need to make sure everything makes sense. I may even give it to my son and ask if it makes sense from beginning to end. Similarly, participants 007 and 011 state that step by step directions are needed and make sure they work by taking sufficient time to make sure the instructions work. Participants 013 and 017 stated "Solid pedagogy is needed when creating or explaining activities in step-by-step ways. They need to be able to read the activity and do everything it says, and it has to work."

Participant 012 states that the voice of the teacher has to be in each slide, just as if the teacher were standing there explaining. Participant 001 stated that the best way to do this would be to record yourself explaining step by step." Once the digital activities are clear, concise, online, and ready to be used, participants 008, 010, and 019 explained that "the teachers' time is much better used from that point on. All the directions, explanations, and resources are complete, the teacher can now focus on the student work. Since everything is in place, the rest of the work time is dedicated to collaboration with the students."

Summary

An investigation into exploring collaboration experiences and perceptions in digital activities among secondary education teachers was conducted. Through a basic qualitative study, 13 participants were interviewed involving their experiences and perceptions of digital collaboration skills among students and how teachers perceive and describe effective digital collaboration strategies among secondary students. To maintain a trustworthy study, steps to maintain credibility, transferability, dependability, and

confirmability were described as they applied to this research. Findings were broken down by individual research questions.

RQ1 involved what secondary teachers' experiences and perceptions are of digital collaboration skills among students. Five themes emerged from semistructured interview with 13 participants: technology accessibility, communication skills, leadership skills, critical thinking skills, and problem-solving skills. Four subthemes also emerged from the interviews: student technological needs, student engagement, student personality, and student proficiency. These themes and subthemes provided evidence that technology accessibility, communication skills, leadership skills critical thinking skills, and problem-solving skills are all needed to collaborate effectively on digital activities.

RQ2 involved how teachers perceive and describe effective digital collaboration strategies among secondary students. Three themes emerged from the semistrutured interviews of 13 participants: collaboration skills and strategies, collaboration challenges and successes, and instructional practice impact. Three subthemes also emerged from the interviews: student distraction, student success, and student engagement and experience. These themes provided evidence that there are needed collaborations skills and strategies for students to collaborate effectively on digital activities that can have an instructional practice impact.

Based on data from interviews and results, I provide interpretations of findings in Chapter 5. I also provide limitations of the study, recommendations for future studies based on data, and implications for findings involving social change.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore secondary teachers' experiences involving implementing digital collaboration strategies and perceptions of effective digital collaboration strategies among secondary students. The nature of the study is qualitative and involved using a basic qualitative design. Thirteen secondary school teachers participated in this research involving virtual semistructured interviews. I conducted this study to address minimal research involving strategies used by secondary school teachers to teach students properly about collaborating using digital activities. Key findings from this study indicate technology accessibility, communication, leadership, critical thinking, and problem-solving skills are perceived by secondary teachers as needed for students to collaborate in digital environments. Participants also described effective digital collaboration strategies that can be used among secondary students.

Interpretation of the Findings

I developed two research questions to explore experiences and perceptions involving secondary teachers' collaboration skills among students and how those teachers perceive and describe effective digital collaboration strategies among students. In this section, I provide an analysis based on research questions. These research questions were:

RQ1: What are secondary teachers' experiences in terms of teaching and implementing digital collaboration strategies?

RQ2: How do secondary teachers perceive and describe effective digital collaboration strategies among secondary students?

During the data analysis phase, eight overarching themes and seven subthemes emerged. Technology accessibility, communication, leadership, critical thinking, and problem-solving skills were themes and student technological needs, engagement, personality, and proficiency were subthemes. Collaboration skills and strategies, collaboration challenges and success, and instructional practice were emerging themes from the analysis. Student distractions, student success, and student engagement and experience were subthemes. This research confirms and extends knowledge based on the literature discussed in Chapter 2.

RQ1

Findings suggested that in addition to accessibility to technology, students need to have strong communication, leadership, critical thinking, and problem-solving skills to be able to effectively collaborate using digital activities.

Findings suggest that teachers and students prefer to use Google Suite as their primary collaborative software tool due to its familiarity and ease of use. Gan et al. (2020) said technology has become a major component in educational systems, specifically Google Docs. Google Docs can lead to more successful products; online word processing tools can be used to encourage participation among students where participation in anonymous and collaborative writing via Google Docs leads to more successful products. Communication skills, both between students as well as students and teachers, is needed to be able to convey information back and forth to accomplish digital tasks. Hughes et al. (2018) said people are required to be able to use collaboration skills to accomplish tasks in digital environments; this confirms the need for collaboration

skills. Without communication, there is no engagement, and without engagement, there is no work being completed. Leadership skills are needed when there is to be collaboration; leadership needs to be assigned, explained, and modeled, or students need to take leadership roles on their own to be able to collaborate. Critical thinking skills need to be taught and modeled by teachers. Problem solving skills are needed to not only solve technological problems that may arise, but also when it comes to digital activities; these skills also need to be modeled and taught. According to Rahman (2019), only knowledge is not sufficient to make students succeed in the world. Students need to attain 21st century skills like problem-solving, creativity, innovation, metacognition, and communication to endure in the modern world. Problem-solving is one of the fundamental human cognitive processes.

Vygotsky and Kozulin (1986) said when cognition is shared between participants, learning occurs. Vygotsky said learners experience increased understanding when collaborating together, using digital tools, such as Google Suite, in a collaborative project or activity. Based on analysis of this research, there are skills needed to effectively work collaboratively such as communication, leadership, critical thinking, and problem-solving.

Siemens (2005) said learning occurs when it is distributed within a network of several individuals or resources, such as a computer with information access and individuals that have knowledge of the content being shared. It also should be social in nature where the shared goal is understood, and individuals are helping each other attain

a shared goal. Technology enhances the collaborative learning experience, and data is able to be recognized, shared, and interpreted to be meaningful.

My findings extend teachers' knowledge of 21st century skills needed by students to be competitive and successful. These skills are needed to effectively collaborate using digital activities (Rahman, 2019). If any of these skills are lacking, then collaboration is less effective, and there are deficiencies in the educational process involving the digital activity.

RQ2

Findings suggested that there have been many challenges and successes in the secondary classroom when students are collaborating and from these successes and challenges, strategies and skills can have an impact on teachers' instructional practices that will help students become better collaborators while working on digital activities.

The findings suggest that students need to feel comfortable and safe in their digital activity to be able to share their thoughts and ideas without being negatively criticized; this needs to be modeled and taught by the teacher. The teacher needs to model how to collaborate in a digital activity where a safe environment is created. The research suggests that a safe environment is needed, the students need to engage in the activity to be able to actively collaborate and efficiently learn (Frazier & Trekles, 2018; Frisch, 2019; Herold, 2016). The engagement is dependent on the lesson creation with best practices used by the teacher as well as using engaging digital tools within the digital activity. Collaboration needs step by step instructions with defined roles of each student to create an efficient and effective learning environment within a digital activity

(Zarrinabadi & Ebrahimi, 2019). Teacher feedback then needs to be given to ensure success in the digital activity (Gentrup et al., 2020).

The results of my research supported the idea that many secondary education teachers lack sufficient knowledge to apply collaborative strategies in the classroom (Howell, 2018). This research led to strategies that can be used in secondary classrooms to benefit the teachers and students when collaborating. First, the teacher needs to model how to collaborate in a digital activity where ideas can be shared without the fear of being criticized. Second, student engagement is needed by using structured lessons that use effective and engaging instructional practices and tools. Lastly, lesson planning needs to include defined roles where each student has specific steps to complete the assignment and what their role is in that assignment (Gentrup et al., 2020; Roberts & Inman, 2021).

My findings confirmed the knowledge of strategies that teachers may use to help their students collaborate when collaborating in digital activities. First, the teacher needs to model how to collaborate in a digital activity where ideas can be shared without the fear of being criticized (Frazier & Trekles, 2018; Frisch, 2019; Herold, 2016). Second, lessons need to be structured using effective and engaging instructional practices to increase engagement (Zarrinabadi & Ebrahimi, 2019). Third, lesson planning needs to include defined roles where each student has specific steps to complete the assignment and what their role is in the assignment (Gentrup et al., 2020; Roberts & Inman, 2021). The gap in research is that there is minimal studies about strategies used by secondary teachers to teach students properly about collaborating in digital activities (Martin et al., 2018; Mirela, 2018). These strategies could help build communication, leadership,

critical thinking, and problem-solving skills that are needed to collaborate in digital activities effectively and efficiently.

Limitations of the Study

Limitations to trustworthiness were minimized since I was able to apply planned strategies for credibility, transferability, dependability, and confirmability. Saturation was a concern since schools and school districts in this area are small. Participant time constraints were also a concern since the interviews could take 30 to 45 minutes and the participants' time is limited due to busy schedules and the need to set aside time to complete the interview. I did not give my opinion or any other action that would result in the participants being influenced to answer the interview questions I was asking differently. I did not conduct any interviews with teachers that work in the same building that I work in and I am not in an authoritative position of any of the participants.

Recommendations

While conducing this study, I gathered information about secondary teachers' experiences and perceptions of digital collaboration skills among students and confirmed strategies that can be used to help secondary teachers teach students how to collaborate. An additional area for research could be the same research questions but instead of secondary teachers, the research could focus on elementary classrooms. Another possible area of research would be to analyze current curriculums for secondary classrooms and analysis of the skills being taught in the curriculum itself. Analysis of communication skills, leadership skills, critical thinking skills, problems solving skills that are scaffolded within the curriculum.

Implications

The findings of this study suggest that students need to feel comfortable and safe in their digital activity to be able to share their thoughts and ideas without being negatively criticized; this needs to be modeled and taught by the teacher. Modeling is needed by the teacher to teach the students how to collaborate in a digital activity. The research suggests that once a safe environment is created, the students need to engage in the activity to be able to collaborate and learn. This relates to Vygotsky and Kozulin's (1986) and Siemens connectivism theory (2005) by showing that cognition is shared between the students when they collaborate using technology to complete a task or project in a digital environment. Connections are also made with digital citizenship (Buchholz et al., 2020) where the question about how we can use technology to engage our students in a digital environment is answered with using strategies such as building collaboration skills to meet those needs. Online collaboration studies also support the need for leadership skills that helps with self-regulation while working in a digital environment (Jolly et al., 2020). Lastly, cloud-based technology supports social learning since the technology is improving and increasing with more devices per student, better and faster internet access, as well as the need for teachers to still guide the student through the content confidently, with a purpose, and collaborative in nature (Chang et al., 2018). The student engagement is dependent on the lesson creation with best practices used by the teacher as well as using engaging digital tools within the digital activity.

Social change refers to any significant alteration over time in behavior patterns and norms. Theories of social change admit the likelihood of resistance to change,

especially when people with vested interests feel unsettled and threatened by potential changes (Levine, 2018). Many secondary teachers in the classroom are preparing students for their careers that require technology and collaboration skills using current collaborative strategies (Sulam et al., 2019). COVID-19 has forced teachers, students, parents, and businesses into a fully digital environment. Before COVID-19, some teachers were reluctant to embrace technology in their classrooms, but COVID-19 forced them to embrace technological usage in the classroom which emphasize the need for skills and strategies to be able to collaborate in the classroom (Aliyeva & Kelly, 2019; Chick et al., 2020). As lesson planning and student success became the primary focus due to change in instructional delivery platform from in-person to virtual, collaboration in the digital environment became and continues to be a focus as we are still dealing with COVID-19 restrictions going into the 2021-2022 school year (Aykan & Yıldırım, 2021).

The initial social change implication from this research was if teachers' awareness to design digital collaborative activities improves, then students may also benefit by strengthening their online collaboration skills. Our educational system and our business sector need to work together to ensure our society is properly prepared for collaboration in a digital environment. This research has generated a few strategies that secondary teachers can use to prepare their students to work within digital activities in an effective and efficient collaborative manner.

Recommendations for practice would lead secondary teachers to use modeling of how to collaborate in a digital activity where ideas can be shared without the fear of being criticized and increasing student engagement by using structured lessons that use

effective and engaging instructional practices and tools. To both model and increase engagement, the teacher needs to create lesson plans that include defined roles where each student has specific steps to complete the assignment and what their role is in that assignment.

Conclusion

The findings from this study came from a basic qualitative research design to explore secondary teacher experiences implementing digital collaboration strategies and their perceptions of effective digital collaboration strategies among secondary students. The analysis of the teachers' experiences and perceptions of digital collaboration skills and the strategies students use to work collaboratively in a digital activity may assist students and teachers with learning collaboration skills. The students can then apply these skills in other facets of their lives such as future education and careers that rely on collaboration skills working in a digital project or activity. I collected responses from 13 secondary teacher participants that met the following criteria: they have access to training in technology usage, access to 1:1 digital devices and experience using collaborative software where students collaborate on digital activities. Analysis based on these participants' responses to the research questions yielded information on the skills needed to collaborate in digital activities and strategies that teachers can use in their secondary classroom to prepare students to collaborate in digital activities. Communication skills, leadership skills, critical thinking skills, and problem-solving skills are all needed to collaborate in digital activities effectively and efficiently in a secondary classroom. Further analysis yielded strategies that can be used in the secondary classroom. First, the

teacher needs to model how to collaborate in a digital activity where ideas can be shared without the fear of being criticized. Second, student engagement is needed by using structured lessons that use effective and engaging instructional practices and tools. Lastly, lesson planning needs to include defined roles where each student has specific steps to complete the assignment and what their role is in that assignment.

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Appendix A: Pre-Interview Google Form Survey

Lenhart Ph.D. Pre-Interview Survey

Please answer the following questions.
I will then follow up with you using your attached email address.
Thank you.
* Required

1. Email address *

2. Name: *

3. School and District: *

4. Grade Level(s) taught: *

Check all that apply.

- [ ] 6th grade
- [ ] 7th grade
- [ ] 8th grade
- [ ] 9th grade
- [ ] 10th grade
- [ ] 11th grade
- [ ] 12th grade

Other: [ ]

5. Subject taught: *

Check all that apply.

- [ ] Math
- [ ] Language Arts
- [ ] Science
- [ ] Social Studies
- [ ] Special Education
- [ ] Other: _____

6. Do you currently or have you worked in a school that has or had sufficient infrastructure to be able to have the students work on their own digital activity? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

7. Do you currently or have you worked in a school that has or had 1:1 device initiatives (each student has their own device such as a laptop or tablet that allows them to get online). *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

8. Do you currently or have you worked in a school that has or had training in using digital tools for collaboration. *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

9. Do you have experience using digital tools for collaboration? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

10. Based on the above criteria, do you know of any other teachers that meet these criteria that I can contact? Please leave their email below. *

_____

Appendix B: Interview Questions

Teacher Code Name: _____

Information (from the pre-interview Google Form)

- Email address
- Name
- School and District
- Grade Levels Taught
- Subject Taught
- Do you currently or have you worked in a school that has or had sufficient infrastructure to be able to have the students work on their own digital activity?
- Do you currently or have you worked in a school that has or had 1:1 device initiative (each student has their own device such as a laptop or tablet that allows them to get online).
- Do you currently or have you worked in a school that has or had training in using digital tools for collaboration.
- Do you have experience using digital tools for collaboration?
- Based on the above criteria, do you know of any other teachers that meet these criteria that I can contact? Please leave their email below.

Research Questions	Interview Questions
Question #1: What are secondary teacher experiences and perceptions of digital collaboration skills among students?	● When your students collaborate in digital activities, which collaboration programs/software do you use and why? Such as Google Suite and/or Microsoft Suite ● What are your experiences and perceptions of student's communication skills while collaborating in digital activities? ● What are your experiences and perceptions of student's critical thinking skills while collaborating in digital activities? ● What are your experiences and perceptions of student's analytical thinking skills while collaborating in digital activities?

	● What are your experiences and perceptions of student's problem-solving skills while collaborating in digital activities? ● What are your experiences and perceptions of student collaboration strategies in digital activities? a. How are these strategies taught to students? ● What did you learn from these experiences?
Question #2: How do teachers perceive and describe effective digital collaboration strategies among secondary students?	● What are the collaboration skills you feel are most effective when working on digital activities and why? ● Which of these collaboration strategies do you feel are most effective and why? ● What would you consider to be the challenges when students are collaborating in digital activities? ● What would you consider to be the successes when students are collaborating in digital activities? ● What impact do you believe that collaboration in digital activities have on your instructional practices and the learning experiences of your students?