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Individual Public-School Teachers' Influence on Technology Implementation

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Walden University
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Abstract

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MA, University of the District of Columbia, 2004

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Many teachers in the United States, despite access to and demonstrated benefits of instructional technology, are reluctant to integrate these innovations into their teaching. Although public schools spend millions to supply the technology to improve instruction and student academic achievement, teachers often choose not to adopt it. The purpose of this generic qualitative study was to understand better how and why many teachers are reluctant to integrate instructional technology in their classrooms. Guided by cultural historical activity theory, the study occurred in two phases. First, the Concerns-Based Adoption Model Stages of Concern Questionnaire was used to identify a sample of 10 teacher participants and then the Levels of Use Interview Protocol was used to collect qualitative data. Key themes were identified from the data using thematic analysis. Findings revealed that the participants valued instructional technology, but user acceptance varied with levels of use. Teachers experienced using the innovation independently more than collaboratively and they perceived the role of schools differently based on personal experience. Understanding teachers' use of the innovation promotes social change by providing information that can inform future teacher adoption of an innovation and teacher professional development. Results from the study can also inform improved instructional design surrounding the use of the innovation to increase academic achievement.

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Dedication

This dissertation is dedicated to my maternal grandmother, Barbara Jean Gray, who always encouraged and supported me. She was a nursing assistant and a maid. My grandmother never finished high school but ensured that education was a priority for her children and grandchildren. It is for her and countless others like her that I continue to study, research, and learn. This dissertation is also dedicated to my three parents, Maureen Gray (mother) and Mr. John and Mrs. Joyce Skinner (my father and his wife). As a team, they ensured that I attended good schools, had all the necessary supplies and resources, and remained diligent in my academic pursuits. Because of my parents, grandmother, and other loving relatives and friends, I dedicate my dissertation. I hope that my work challenges my peers and students to continue to pursue their dreams.

Acknowledgments

This moment took 10 years. Completing my coursework and dissertation has been a tremendous and tedious undertaking. Without my committee, family, friends, and professional peers consistently encouraging and nudging me, this dissertation would not be real.

I am grateful for and admire my initial advisor, Dr. Thomas Thompson, for assisting me with changing programs, adapting to using APA, and training me earlier on to be a true scholar-practitioner. Because of him and his mentoring and leadership, I was matched with Dr. Felicia Blacher-Wilson, who was always a motherly presence and objective taskmaster and role model. I am grateful for your time, guidance, patience, and efforts. You gently pushed me to be the best person and student researcher I could be. Special thanks to Dr. Ronald Paige and Dr. John Flohr, who were gracious enough to become my committee when no one else would. I have enjoyed your honesty, preparation, support, and perspective tremendously throughout the process.

I would especially like to thank my mother, Maureen Gray, my former principal, Cordelia Postell, my aunt, Dianna Hill, and my niece, Sharrell Davis. My mother always challenged and stimulated my rationale, thought process, and perspective. My mother has always encouraged my academic pursuits. I love you so much. I am so appreciative and indebted to my former boss, my aunt, and my niece, who, out of love and friendship, and good credit, made it possible for me to complete my final years at Walden University.

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Chapter 1: Introduction to the Study

Education has served as a tool of innovation and modernity. History has shown that educators have not typically accepted educational technologies; also, educators did not accept most reform policies associated with the technologies either (Hill & Guzdial, 2017). The implementation of technology, or the lack thereof, in the classroom, has been a quandary (Cuban, 2013). History has shown that based on the need for discipline, ethics, or economics, education has served as a technological tool to attempt to socialize, moralize, or equip students to meet the needs of the country and themselves (Falconer, 2017; Slavich & Zimbardo, 2012). Since colonial times, educational innovation and technology have rarely been easily adopted or integrated into mainstream culture, society, or the classroom (Falconer, 2017; Hill & Guzdial, 2017). Even though there has been modest progress, many educators cannot or do not implement or integrate contemporary technologies into their classrooms within the United States (Cuban, 2013, 2020; Falconer, 2017; Hill & Guzdial, 2017).

Chapter 1 provides background information about teachers and the implementation of educational technology. The major sections include Background, the Problem Statement, the Purpose of the study, Research Questions and Hypotheses, the Theoretical and Conceptual Frameworks, the Nature of the Study, Definitions of Terms, Assumptions, Scope and Delimitations, the Significance of the Study, and a Summary. Each section provides clear and explicit information about the generic qualitative study.

Background

American public schools can be perceived as an innovative effort. American schools were created to assist with the socialization and normalizing of the British settling and migrating over to the 13 colonies (Falconer, 2017). Initially, British parents taught their children, primarily White male children, reading and mathematics, but as time passed, the schools (as proxies for their respective towns) assumed from parents and families more and more of the responsibility of educating White youth. At this time, the first American education system innovation was introduced: the textbook (Falconer, 2017).

Like the American school and the textbook, American teachers can be perceived as an educational innovation. Early American teachers were not required to be educated. However, by the early 1900s, teachers, mostly middle-class women, began to be formally trained (Falconer, 2017). As the educational demands on newly emerging teachers grew, so did the emergence and growth of instructional devices and innovations. Americans began to use calculators, televisions, radios, videos, cellphones, computers, and—today—the Internet. Still, whatever the current technology—film projector or video projector, scientific calculator, or educational device—many teachers seem to struggle to teach their students to learn because the teachers are either not knowledgeable about educational technology or teachers are not adapting or transforming instruction to incorporate instructional media or technology to engage their students (Cuban, 2013; Hill & Guzdial, 2017; Siemens et al., 2013).

Teachers are perceived to be in control of the curriculum and the classroom. Kurilovas (2020) pointed out that the curriculum presented to students in the classroom is a product of teacher choice. To improve instruction for students and for educational technology to be better used, integrated, and adopted in the classroom, further reflection was needed about why teachers are not as knowledgeable about or better at employing educational technology. Researchers have encouraged reflection on more than what is observed or witnessed in a school, specifically the classroom (Kurilovas, 2020; Spain, 2016). Kurilovas concluded, for teachers to desire to be more knowledgeable or accepting of educational technology, teachers' interactions with administrators as well as prevailing standards and internal constructs require further examination. Also, Kurilovas proposed that collaboration between teachers and innovation is necessary because even if it has been demonstrated that an innovation such as education technology is successful with improving academic achievement, school systems and most teachers historically and consistently choose the status quo (Cuban, 2013, 2020; Spain, 2016).

Problem Statement

There is a problem in that many public-school teachers, despite access to instructional technology and research data, are reluctant to integrate instructional technology in their respective classrooms. Currently, and historically, a preponderance of teachers has been perceived not to integrate technology into instruction in the classroom, even if it is available (Cuban, 2013; Khlaif, 2018). In most American school districts, P to 12 teachers are free to integrate educational technology or instructional media in the classroom. What is not so obvious, however, is that many factors influence teachers when

it comes to technology adaption, implementation, and usage for instructional purposes (Bozkurt et al., 2014; Li & Choi, 2014). These factors include, but are not limited to, a teacher's beliefs, depth of technological knowledge and confidence, training, experience, institutional priorities, and administrative and monetary support (Bozkurt et al., 2014; Kalonde & Mousa, 2016; Li & Choi, 2014). It is a concern that many teachers do not tend to integrate instructional technology, even though children enjoy or prefer technology usage in the classroom, and technology has been demonstrated to contribute to student achievement positively (Bozkurt et al., 2014; Chung & Chang, 2017; Demir & Akpinar, 2018; Harris et al., 2016; Kotluk & Kocakaya, 2017). Technology, especially new technology, has become a major component of teen pop culture and young people's daily lives (Lee, 2015; Li et al., 2015). Too many teachers seem to be resistive to integrating educational technology in their classrooms in ways that would enable their students to become more engaged in the learning experience (Bozkurt et al., 2014; Byker et al., 2017; Cuban, 2013; Margolin et al., 2019; Petko et al., 2018).

Many public-school teachers opting not to integrate instructional technology in the classroom is a problem (Byker et al., 2017; Cuban, 2013; Li & Choi, 2014; Margolin et al., 2019; Petko et al., 2018). While many educational stakeholders (school administrators, parents, students, researchers, teachers, and theorists) are committed to modernizing and improving American education via educational policies, programs, processes, and practices, the giant leap required by teachers to implement them or schools to adopt them within less than 3 years, due to either political reasons or the shelf-life of contemporary technology, triggers failure or a lack of buy-in (Hall & Hord, 2015).

Additionally, policies, programs, processes, and practices about adopting, integrating, or implementing educational technology are still not widely received or integrated even though educators (administrators and teachers) acknowledge the benefits of implementation (Cuban, 2013, 2020; Hall & Hord, 2015; Li & Choi, 2014). Even though public-school systems are spending millions to supply educational technology to improve instruction and student academic achievement, teachers often opt out of adopting educational technology mainstream (Khlaif, 2018). In summary, this study addressed the gap in understanding public school teachers' reluctance, despite access to instructional technology and research data, to integrate instructional technology in their respective classrooms.

Purpose of the Study

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. In most U.S. school systems, teachers can choose to use traditional methods of instruction, or they can opt, most times, to use alternate or innovative methods (Cuban, 2013). It was essential to learn from teachers the meaning or reasoning involved in choosing or avoiding certain instructional methods. For example, Margolin et al. (2019) suggested that teachers' perceptions, norms, environmental influences, and internal constructs appear to influence the integration of instructional technology into instruction within their respective classrooms. Understanding these remarks from Cuban (2013) and Margolin et al. is important to educational reformers and stakeholders because student academic success is

the desired outcome. If all educational stakeholders desire academic success for students, then studying why proven instructional methods are not being implemented is warranted.

Research Questions

The following research questions (RQ) were used to guide this research study:

RQ1: How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their respective classrooms?

RQ1a: What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?

RQ1b: What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?

RQ1c: How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?

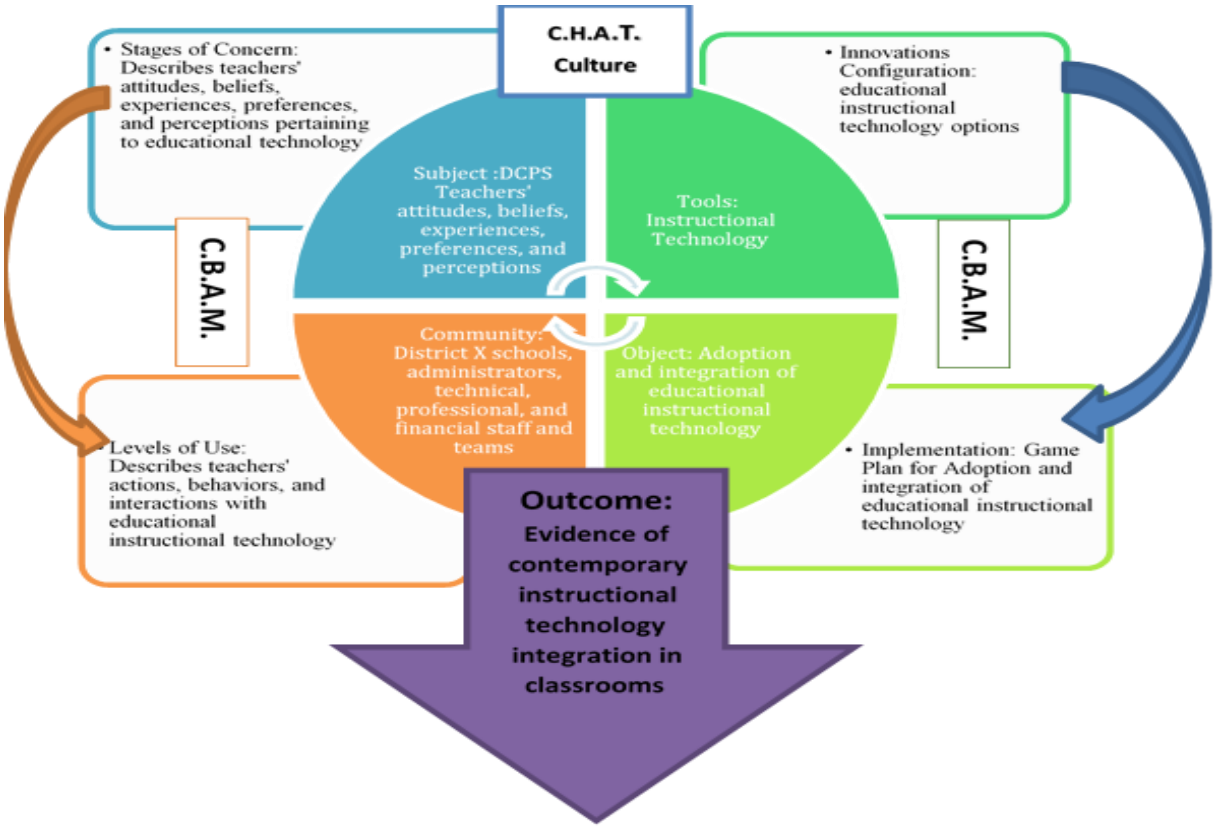
Theoretical and Conceptual Frameworks

Figure 1 depicts how I operationalized the theoretical framework based on the cultural-historical activity theory (CHAT) as a conceptual framework using the concerns-based adoption model (CBAM). Figure 1 has been designed to illustrate the connections between CHAT and CBAM to highlight how and why teachers, despite access to educational technology and research data, are reluctant to integrate educational

instructional technology in their respective classrooms. The diagram should be read from the inner circle to the outer square (CBAM).

Figure 1

Relationship between theoretical and conceptual frameworks



The inner-circle (to be read clockwise from top left to right and then lower right to left) is a visual representation of the subject of research (teachers' attitudes, beliefs, experiences, preferences, and perceptions), along with the tools (instructional technology) to be used in connection with the object of the study (the implementation of the instructional technology) within the community, District X (including its administrative, institutional, technical, professional, and financial staff), using CHAT. The two arrows

within the circle depict how each aspect of CHAT (culture) is interconnected. The outer rectangles (from top left to bottom left and top right to bottom right) form a square that depicts and illustrates how teachers' stages of concern and levels of use influence the implementation of instructional technology within the District X school system's classrooms, a pseudonym. The outer arrows are meant to show how the emotional concerns of teachers are connected to their actions or practices.

Cultural-Historical Activity Theory (CHAT)

The CHAT served as a theoretical lens to assist with identifying, analyzing, describing, and understanding the relationships between how what teachers perceive and think influences how they act toward the implementation of instructional technology for student learning. The theory helped frame how I observed, developed the interview protocol, interpreted, and described teachers' behaviors as outcomes of their beliefs and perceptions as part of their technology integration activities (see Postholm, 2008).

CHAT is a learning theory derived from European origins and is a culmination of the work of Aristotle, Vygotsky, Leont'ev, and Dewey (Abella, 2018). The theory pertains to how people have learned from acting or doing via repeated action or practice. Culturally and historically, societies have attempted to get children or students to learn by acting or behaving in ethical, moral, or religious ways based on the perspectives of educators, politicians, and community leaders for the greater good or betterment of humanity (Abella, 2018). Similarly, proponents of CHAT have suggested that based on the perspective of the adults or leaders involved and the required actions of the youth

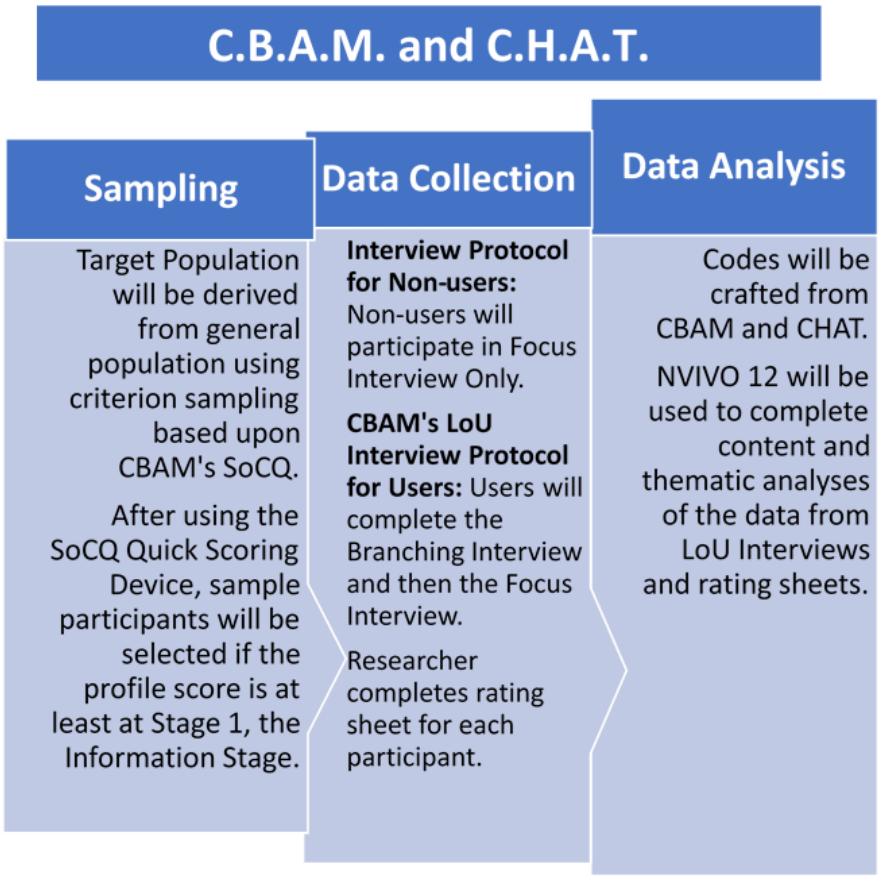
involved, the description and the process of learning changes, whether beneficially or adversely for humanity (Abella, 2018).

Concerns-Based Adoption Model (CBAM)

The American Institutes for Research (AIR, 2017) defined CBAM as a three-dimension diagnostic model originated from researchers at the University of Texas at Austin (Hall & Hord, 2015). About 10 years ago, the theory was updated to ensure its accuracy (AIR, 2017). CBAM is a set of tools used to assist researchers in understanding, monitoring, and guiding the complex process of implementing innovation or technology (AIR, 2017; Hall & Hord, 2015). CBAM was used to select the purposive sample, interview participants, describe, and analyze how teachers influence the adoption of instructional technology in association with instruction at public schools (see AIR, 2017; Hall & Hord, 2015). CBAM guided me in questioning teachers on how, why, or if they implement instructional technology and guide my interviewing of teachers about their attitudes, beliefs, perspectives, and levels of usage (see AIR, 2017). CBAM allowed me to more completely describe how the compatibility, complexity, and relative advancements of instructional technology are connected to how teachers perceive the appropriateness and usefulness of adopting instructional technology. In Figure 2 below, the uses of CHAT and CBAM are described pertaining to sampling using CBAM's Stages of Concern Questionnaire (SoCQ), data collection using CBAM's Levels of Use (LoU) Interview Protocol, and data analysis using codes derived from both frameworks. NVIVO 12 software was used for data analysis. A complete description is provided in Chapter 3.

Figure 2

Use of the Theoretical and Conceptual Frameworks



Nature of the Study

I chose a qualitative approach using the generic qualitative research design for conducting this study. A two-phase method was employed. In the first phase, the SOCQ (Appendix A) was used to establish the criteria to determine the sample of teacher participants who were interviewed, and a teacher participant needed a score of Stage 1 or higher to continue to the second phase. If a teacher scored at least at Stage 1 (Information stage), the teacher demonstrated that they were concerned about integrating instructional technology. A wide range of potential target audience teachers was desirable for Stage 1

because it increases the potential for rich information from the purposive sample. Drawing upon common elements of case study design (Merriam & Tisdell, 2016), the unit of analysis for this study was the influence of the classroom teacher regarding the implementation of instructional technology in P to 12 public schools of the study setting. Having a specific unit of analysis allowed me to focus on the study problem and not the many potential influencing variables (see Merriam & Tisdell, 2016).

In the second phase, the LoU Interview Protocol (Appendix B), in conjunction with borrowed elements of the case study and phenomenological approaches, was used to gather and help analyze data from the participants of the research. The LoU interview protocol enabled me to use a proven interview protocol to help ensure the collection of data appropriate to developing a rich, thematic understanding from the interview responses. Also, this generic qualitative study, like a case study, was bounded by time, location, and environment, did not exceed an academic school year, and took place within a specific urban public school system (see Kahlke, 2014; Kennedy, 2016; Merriam & Tisdell, 2016). Like a phenomenological approach, this generic qualitative study involved asking teacher participants to describe their experiences as instructional technology decision makers, but, unlike a typical phenomenological study, this one was constrained by the case study concept of bounding and the researcher control associated with the interview protocol (see Merriam & Tisdell, 2016).

Definitions of Terms

I defined key terms and phrases that were used in my research study. The definitions in this section give understanding, clarity, and context to the keywords throughout the research.

Academic achievement: Academic achievement is performance outcomes from assessments, educational or instructional goals, or based on grades that demonstrate to what extent a student has achieved or accomplished explicit goals surrounding academic activities in schools and their systems (Steinmayr et al., 2018).

Adoption: According to Hall and Hord (2015), change, in the form of a policy, practice, program, or process, is not implemented by organizations (schools or school systems), it is adopted or accepted.

Attitude: Teachers' attitudes are defined as the feeling, opinion, or impression they have about someone or something (McDougald, 2015).

Change: Hall and Hord (2015) define change as a constant, often complex process, not a single event that involves individuals (teachers) and organizations (schools) having to learn personally or professionally to effect, improve, adapt, or implement change.

Educational Technology: Melchor and Saez (2019) defined educational technology as a field or approach that combines theories and practices of education using computer hardware and software to improve academic performance and make learning easier.

Implementation: When the change process occurs on an individual (teacher) level within an organization (school or school system), it is implemented or executed (Hall & Hord, 2015).

Instructional media: The term is defined as "the physical means in which instruction is presented to learners" (Reiser, 2018, p. 1).

Instructional technology: Findlay-Thompson et al. (2015) proposed that instructional technologies are tools or resources used in the classroom to aid with assessments, instruction, and teaching. According to Bozkurt et al. (2014), instructional technology is the combination of theory and practice with the goal of learning during the stages of design, development, practice, and evaluation and includes learning-teaching settings, pedagogical studies and services management, library services, means of communication, and the teaching of technology. Some of these items include SMART Boards™, PowerPoints®, other presentation platforms and software, electronic collaboration platforms, handheld devices like clickers, and online evaluation tools.

Multimedia: Multimedia is audio and video communication tools used to make thought-provoking and interactive online education, and they use computer technology to permit the construction, manipulation, and exchange of educational resources (Roush & Song, 2013).

Technology Adoption: In the framework of this study, technology adoption refers to the acceptance of teachers to continuously use and integrate new technologies into their instructional practices (Warner & Myers, 2013).

Urban public schools: Urban public schools are public schools located in large major cities where poverty, crime, and employment tend to be key concerns and are an international educational concern (McCoy & Bowen, 2015).

Assumptions

Many assumptions underpinned this study. One assumption was that many teachers would be available or agree to participate in this study. Also, I assumed that the teacher participants would provide varied and diverse responses to the interview questions. More specific to the participants in this study was my assumption that the teachers who opted to participate would be honest during the interview portion and not have ulterior motives for volunteering to participate. A related assumption was that the teacher participants would comply and provide relevant details about their experiences with instructional technology that would be useful to the study. Another assumption was that teachers that agreed to participate in this study would complete the entire criterion-based sampling and interview processes. I assumed that teacher participants have used instructional technology of some type at some time in the classroom and, therefore, know what instructional technology is. A similar assumption was that the teachers who chose to participate in this study would know and comprehend their reasoning and decision making about the levels of usage, stages of concern, and incorporation of instructional technology in the classroom. I assumed that the teachers who opted to participate were genuinely concerned about their students' academic welfare (see Cuban, 2013). I assumed that teachers who volunteered to participate in the study had access to technology in the classroom.

There were several assumptions associated with the purposeful sample to be used for the study. One was that the sampling criteria would increase the possibility that participating teachers would have a diversity of qualifications, instructional attitudes, experiences, and instructional practices. While many of the teachers could have diverse backgrounds and experiences, using a criterion-referenced sample enhanced the probability that the data collected would be accurate and useful (see Merriam & Tisdell, 2016). A final assumption was that with qualitative research, there was a likelihood for potential personal biases would or could subjectively influence the study about methodology selection, sample selection, data collection, data analysis, and reporting and could diminish or undermine the objectivity and validity of each component. I acknowledged my biases, limitations, and beliefs throughout the study as the researcher, data collector, and field agent because these factors could make reporting this study difficult (see Merriam & Tisdell, 2016; Yin, 2014). Yin (2014) suggested that I must have a clear research design, use exact language, and compare the data collected and the results to facts obtained in the literature review.

Scope and Delimitations

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. Like a case study, this study was bounded by time, location, and environment and did not exceed an academic school year and transpired within a specific urban public school system (see Kahlke, 2014; Kennedy, 2016; Merriam & Tisdell, 2016). The scope of this study was

delimited to District X (pseudonym) and its public-school system, specifically P-12 grade public school teachers who volunteered to participate. The rationale for having a representation of P-12 grade teachers was to increase the chances of accumulating a large enough target population to select a purposive sample that was "based on expected reasonable coverage of the phenomenon given the purpose of the study" (Patton, 2015, p.314). As of 2020, District X is comprised of over 110 schools and has a student population of over 51,000 students. Although there have been studies and research projects about instructional technology and various instructional environments and levels of instruction, this design and topic chosen were selected because there has been limited study of instructional technology in connection with the District X school system that is representative of similar large urban public schools in the United States.

In terms of accessibility and manageability, there were a few delimitations. One, the participants were allowed to complete the surveys online or from a printed version that could be scanned and emailed back. Also, to save time, a more traditional qualitative study like a case study or phenomenology was not used because it could consume large amounts of time and require the potential use of multiple theories. Instead, I employed two of the three research-based diagnostic tools of CBAM to save time. The SoCQ was used for criterion-based sampling, and LoU Interview Protocol was used for data collection. The study occurred only in City X (pseudonym) was perceived as limiting the generalizability of its potential findings, yet the District X school system is comprised of various grade levels and school models, which may increase transferability.

Limitations

Several limitations could adversely affect this study. The first limitation was the duration of the study (see Merriam & Tisdell, 2016; Patton, 2015). Longitudinal studies seem to be the most desirable (Merriam & Tisdell, 2016), but this entire study was intended to transpire within 3 months, not to exceed a year, to limit costs. The second limitation was that there could be unforeseen personal, environmental, or systemic biases within the school system and its teaching staff (see Merriam & Tisdell, 2016; Patton, 2015). Concerning environmental biases, they can pertain to physical setting or professional influences. Environmental biases can be resolved by anonymity and confidentiality of professional influences along with holding interviews off campus. Comstock and Wodon (2017) and Jacobs (2013) concluded that systemic biases can include having a high number of students identified as children with special needs, a large population in lower socioeconomic brackets, and many students who are not meeting academic goals. District X has several of the criteria that can be considered systemic biases. The fourth limitation was related to external validity. The transfer of the results of this study to other studies or contexts could be reduced if either the descriptions of the context or the assumptions of the study are limited or thin. I used the two-phase sampling strategy to address the limitation. The two-phase strategy involved using the SoCQ, a proven tool of CBAM, to derive the study sample to enhance replicability and, thus, transferability. I used the SoCQ, and only interviewed participants who received a score of Stage 1, the Information Stage, or higher. The participants who received a score of Stage 1 or higher participated in LoU interviews to maximize variation. Maximizing

variation improved the diversity of the sample and improved the likelihood of identifying common patterns across the diversity of participant interview responses. By selecting participants who received a score of at least Stage 1, they had a basic awareness and concern of the innovation, and they wanted to know more. A fifth limitation, addressed in Chapter 3, was my level of proficiency and accuracy with using CBAM (specifically two of its diagnostic tools) and CHAT. To address the limitations or threats to internal validity and to address confounding variables, this qualitative-only approach involved using the CBAM tools as mandated by SEDL. Because the SoCQ is a quantitative element, it was only used to determine counts (most and least), to provide the criterion test for sample selection, and to identify contextual elements that would inform the additional questions during interviews. There was not a need for special training for SoCQ or a pilot study.

Significance of the Study

The findings of this study may positively contribute to future research that focuses on understanding how and why many public-school teachers resist integrating instructional technology even though they have access to instructional technology and research. There is a pre-existing gap in the research literature related to teachers and their attitudes and actions about the individual implementation of instructional technology in P to 12 classrooms (Khlaif, 2018). Also, this study assisted with acknowledging teachers' concerns when confronting change that stems from the implementation of instructional technology, while permitting the teachers to understand better their perceptions and motives toward the implementation of instructional technology (see Cuban, 2013;

Falconer, 2017; Hall & Hord, 2015; Hill & Guzdial, 2017; Kurilovas, 2020; Li & Choi, 2014; Margolin et al., 2019; Siemens et al., 2013; Spain, 2016). The findings from this study could inform professional development and instructional strategies that would aid administrators to help teachers with the implementation of instructional technology. Notably, teachers' concerns influence both the rate and success of instructional technological implementation and thus inadvertently have an important role in the process of the adoption of instructional technology locally and nationally by school systems or districts (AIR, 2017; Hall & Hord, 2015).

Nationally there has been a push to improve academic achievement and technology implementation in public schools (Chebli et al., 2017; Havard et al., 2018; Paul & Vaidya, 2014; Smith, 2018). Over the past 20 years, further discussion has been needed concerning the use of instructional technology by highly qualified teachers to engage children in the classroom and close the achievement gap (Rollert, 2015). This generic qualitative study, and its findings, could contribute to the knowledge base and improved instructional practices at P-12 public schools on implementing instructional technology, especially technology used for instructional purposes. Also, this study could aid in the improvement of public-school learning environments. This study could assist in reducing the achievement gap in the District X school system by providing means to encourage teachers to adopt technologies for increasing student interaction with content, instruction, and assessment in the classroom. The generic qualitative research approach could also assist teachers in complying with local evaluations such as IMPACT

(evaluation and feedback system for teachers work within the school system) guidelines and positive social change.

Summary

According to standardized assessment data, the achievement gap widens in urban learning settings (Moratelli & DeJarnette, 2014). Teachers and other stakeholders are working to instruct and engage students to improve student attendance, grades, standardized test scores, and increase student learning. The desired outcome of this study is the effective and efficient implementation of instructional technology by classroom decision makers, especially individual classroom teachers. Implementing instructional technology should lead to the expanded use of "interventions that work in a school setting and result in positive achievement outcomes" (Paul & Vaidya, 2014, p. 1241). With teachers and other school stakeholders working to improve instruction to decrease the achievement gap, the desired outcome of this study should be more appealing to teachers than the status quo.

In Chapter 1, a description was provided of the generic qualitative study. The problem I addressed is that even though public-school teachers have access to instructional technology and research data, they tend to choose not to adopt or implement instructional technology (see Khlaif, 2018). The purpose of this generic qualitative study was to comprehend how and why public school teachers' beliefs, reasoning, perceptions, actions, and experiences pertaining to other educational stakeholders and local school culture influence the choice or avoidance of integrating instructional technology in the classroom (see Cuban, 2013). CHAT is the foundational theory being applied, and two of

the tools of CBAM, the theoretical framework, were used for sampling and interviewing teacher participants.

In Chapter 2, the literature on instructional technology, the achievement gap, the suburban and urban learning environments, and achievement were reviewed and discussed. Relevant theories and models were discussed and reviewed in Chapter 2. In Chapter 3, there is discussion of the generic qualitative study, along with more in-depth information about the research methodology, the participants, the setting, instrumentation, issues regarding trustworthiness, and the protocols for data collection and analysis provided. I have presented in Chapter 4 an in-depth description of the setting, demographics, and data collected and analyzed, evidence of trustworthiness throughout the study, and the findings or results. In the fifth and final chapter, the interpretation of the findings, the limitation of the study, recommendations for future research, and the implications revealed from the generic qualitative study are discussed and offered.

Chapter 2: Literature Review

Too many American teachers are perceived not to integrate learning technology into instruction in the classroom. The problem is that even though public-school systems are spending millions to supply educational technology to improve instruction and student academic achievement, teachers often opt out of adopting educational technology mainstream (Khlaif, 2018). In my study, I addressed this problem and its attending gap in the literature by providing insights into why public-school teachers, despite access to educational technology and research data, are reluctant to integrate educational instructional technology.

Teachers use technology in the classroom to assess students and for students to complete tasks, but the teachers seem to prefer teacher-directed lessons instead of student-centered technologically integrated lessons to improve learning (Cuban, 2013). P-12 teachers are free to integrate instructional technology within their respective classrooms; however, teachers tend to not do so for various reasons (Bozkurt et al., 2014; Jack & Higgins, 2019; Li & Choi, 2014). These reasons include, but are not limited to, a teacher's beliefs, depth of technological knowledge and confidence, training, experience, institutional priorities, and administrative and monetary support (see also Bozkurt et al., 2014; Kalonde & Mousa, 2016; Li & Choi, 2014). Education technology has been proven to positively contribute to student achievement and their daily lives (Bozkurt et al., 2014; Chung & Chang, 2017; Demir & Akpinar, 2018; Harris et al., 2016; Kotluk & Kocakaya, 2017; Lee, 2015; Li et al., 2015). Despite the benefits, many teachers seem to resist integrating instructional technology (Bozkurt et al., 2014; Cuban, 2013).

The purpose of this generic qualitative study was to use the collected data to more fully understand how and why teachers' perceptions, norms, environmental influences, and internal constructs appear to influence the integration of instructional technology into instruction within their respective classrooms. The purpose was derived from the problem that teachers have not been adopting or using instructional technology in the classroom even though technology has been shown to contribute to student academic achievement and engagement (see Li & Choi, 2014; Slavich & Zimbardo, 2012).

The literature reviewed in this chapter provided a working overview of the seminal and current literature that establishes the relevance of the research problem, demonstrate the credibility of the study's purpose, and provide a foundation for addressing the research questions. The current literature suggested that despite the benefits of instructional technology, teachers opt not to adopt instructional technology at all or consistently for instructional purposes because of a lack of professional development, experience using it in the classroom, or a lack of confidence. Cuban (2013), as well as Jack and Higgins (2019) suggested that students' exposure to instructional technology for instructional purposes is often limited, and teachers often seem only to use instructional technology as an instructional aid to deliver a lesson and not a learning device to promote student-centered learning. Also, even when teachers have been pushed to improve instruction based on high stakes assessment scores, they tend to use instructional technology merely as an aid for teacher directed instruction and not using technology for instructional purposes (Cuban, 2013).

Multiple researchers (e.g., Burke et al., 2018; Chien et al., 2016; Christensen & Knezek, 2017; Clark & Mayer, 2016; Cuban, 2013; DePountis et al., 2015; Stewart & Stewart, 2013) have concluded that while there have been many technological booms and educational reform initiatives, there is little to no evidence that supports the notion that most teachers want to adopt instructional technology in the classroom. Also, researchers concluded that when teachers have adopted it, they only have used it briefly, inconsistently, and ineffectively. According to Cuban (2013), Depta (2015), and Popova and Fabre (2017), teachers seem reluctant or less likely to adopt or integrate instructional technology in the classroom because other stakeholders (administrators, parents, students, and community partners) either control the curriculum or determine when and if teachers can use technology for instructional purposes. Also, Popova and Fabre proposed that teachers may adopt instructional technology for instructional purposes if conditions are conducive; they also stated that culture, economy, infrastructure, professional development, skill set, adequate technology, stakeholder support, and politics could play a factor. Petko et al. (2018) suggested that teachers' attitudes, beliefs, lack of knowledge of the benefits of integrating instructional technology, confidence, and accessibility seem to constrain teachers. Cviko et al. (2014), Latulippe (2016), and Savasci Acikalin (2014), concluded that teachers would possibly be more likely to adopt instructional technology if they had a role in designing curriculum or instruction. This study built upon the work of Liu and Szabo (2009), Mohammed Al Masarweh (2019), Ranjdoust et al. (2012), Jones and Moreland (2015), Min (2017), Samiei and Laitsch (2010), and Sardegna and Dugartsyrenova (2014) to provide insight and contribute to the current literature about

how and why public-school teachers' actions, perceptions, beliefs, and experiences directly affect the integration of instructional technology in the classroom. Also, the findings of this study could aid in improving instructional practices for public school teachers.

Preview of Major Sections

In this chapter, I have presented the literature search strategy that includes the lists of databases, search engines, and key search terms, as well as a description of current peer-reviewed literature. Also, in this chapter I describe the origin, assumptions, and propositions about CHAT. Following the description of CHAT is a description and synopsis of the conceptual framework based upon the CBAM. The final major section of the chapter focuses on the literature on key concepts. These concepts include instructional technology and instruction, teacher focused approaches to change, instructional environment, culture and climate, student engagement, and methodological considerations. The chapter closes with a summary.

Literature Search Strategy

The literature reviewed below serves to provide a complete understanding of how and why teachers' perceptions, norms, and internal constructs often negatively influence the implementation of instructional technology into their respective classrooms. Initially, I searched for literature using the Walden Library's website. Using mainly Education Source, ERIC, and the SAGE journals, I searched the articles on education in association with the following key terms: *Common Core State Standards, achievement gap, instructional environment, urban schools, technological adoption, technological*

implementation, instructional technology, instructional innovation, CHAT, the District X school system, CBAM, stages of concern, and *levels of use*. With each database, I limited the results by selecting the peer reviewed, full text, and a range of years depending on how many results there were. With each database, I searched for each term first and then combined it with each of the other key terms. For example, searching just for "educational technology" in the Education Source database, those combined terms resulted in over 39,000 articles. I narrowed the date range to 5 years, and the resulting number changed to about 14,000 articles. I narrowed the date range down to 1 year, and the result was still in the thousands. So, I then added the search term *teacher's perspectives* and the result became 35. I read the articles and eliminated articles that either did not address the research questions or the nature of the study. For instance, if the article or study pertained to teachers evaluating student learning online or the use of role playing in the classroom, such an article would no longer be considered. This search process was repeated for multiple groupings of terms.

When using the article databases, the search process was less effective when searching for CHAT, CBAM, and methodology. Some results provided articles that either referenced primary sources or were studies or reports that used the theory, framework, or methodology, but the results were few. When the content of interest happened, I then returned to the Walden Library site and searched books. The search for the terms CHAT, CBAM, and methodology yielded results. Finally, I read and used books recommended by Dr. Paige, my committee chair. To locate relevant resources, I used key terms associated with the problem, purpose, and research questions. These key terms or topics

included *instructional technology, instructional technology and instruction, instructional motivation, student engagement, achievement gap, instructional or learning environment, CHAT,* and *CBAM*.

Theoretical Foundation

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. The CHAT served as a theoretical lens that would enhance my capabilities with the analysis, description, and comprehension of how teachers think, perceive, and act influence their decision to adopt instructional technology based on human, societal, and cultural needs. CHAT aided me in framing how I observed, described, and interpreted the data to answer the research questions (see Lim, 2019; Postholm, 2008).

Trust (2017) commented that CHAT is a theory based on the premise that the activity system (classroom) provides the context for the general phenomenon (lack of classroom use of contemporary technology for instruction) and the unit of analysis (the influence of public school teachers on the implementation of instructional technology in the classroom) in which the subjects (individual teachers) are motivated to change or adopt an object or objectives (classroom instruction) into positive learning outcomes. Additionally, still following Trust's perspective, the change in the classroom objectives illustrate the reasoning as to why the teacher acts (the conscious implementation of contemporary instructional technology or the decision not to) based on interactions or experiences within the activity system (the individual classrooms in each school system).

According to Lim (2019), CHAT was an ideal conceptual framework for this qualitative study.

Similarly, Barrett-Tatum (2015) concluded that CHAT is a sociocultural theory that was ideal for this qualitative study because the author of CHAT described how teachers' perceptions of classroom instruction served as both a cultural and ideological practice. This perception aligns with Trust's (2017) description of an activity system, such as a classroom, being a network of cultural and social features "with complex mediational structures that shape the collective actions of individuals who are motivated to achieve a goal" (p. 100). Understanding the value of CHAT as the theoretical framework for my study required understanding how CHAT has evolved from a theory about analyzing and understanding the relationship between the human mind and human activity. It also involved understanding how sociocultural events subjectively mold consciousness into a more comprehensive theory (Lim, 2019).

CHAT-Version 1: Vygotsky

CHAT is a theory that has been revised or enhanced twice during its rich history. CHAT originated in Vygotsky's cultural-historical activity model that involves a subject, the subject's objective, and the resources used to obtain the object or objective (Barrett-Tatum, 2015). Vygotsky's activity model proposed a semiotic relationship between the subjects, their reasoning, and their activities or actions within the world (Derry, 2013; Haenen, 2001). According to Kaptelinin and Nardi (2009), Vygotsky believed that to illustrate the impact of culture on a person's mind, one would need "to follow developmental, historical transformations of mental phenomena in the social and cultural

context" (p. 39). Also, what distinguished Vygotsky's version is the notion that analysis should be conducted in research using units of analysis and that research should include formative experimentation or "experimental intervention into the process of development aimed at facilitating the emergence of certain developmental outcomes" (Kaptelinin & Nardi, 2009, p. 41). Based upon those criteria, Vygotsky focused on two types of interactions in his studies: internal/external and individual/collective, relating to the boundary between the human mind and the sociocultural world (Kaptelinin & Nardi, 2009). An example would be a student or novice teacher (individual and subject) internalizing or becoming familiar with tools or resources found in the classroom (technology-infused pedagogy) and how the teacher (individual) learned how to use the tool via tool-mediated activity (collective and external) with students and the school community (Haenen, 2001).

Importantly, in the original version of CHAT the concepts of mediation and internalization were introduced by Vygotsky. Mediation, to Vygotsky, described the appropriation and use of signs and tools as a component of psychological development (Kaptelinin & Nardi, 2009). In other words, Vygotsky believed that people rarely intermingle with the world directly; instead, some artifacts, instruments, signs, or tools are used to mediate these external activities and interactions. These tools, or mediators, assist mental processing via sociocultural developed means (Kaptelinin & Nardi, 2009). For example, a teacher would not necessarily interact with the school community unless he or she was triggered by a tool or instrument, such as a survey or meeting, that would

require a teacher to meet with the guardian or parents of his or her students for instructional or educational purposes.

Barrett-Tatum (2015) and Yamagata-Lynch (2010) concluded that earlier iterations of CHAT gave researchers a framework that presented the subject and the environment in a complex system in which the two cocreated cognizance based on the subject (an individual, a group of individuals, or an organization) partaking in activities. According to Yamagata-Lynch's study of complex activity systems, Vygotsky intended to create a framework that would permit an objective study of human participation in activities. However, this version focused more on the individual than the collective and shed light on the contextual problems Vygotsky encountered (Engeström, 1987). As a result, Vygotsky's early version of CHAT "does not develop an analytical framework capable of situating learning within a wider context, accounting for the collective and dynamic nature of activities" (Hardman, 2007, p. 113). This posed a limitation for my study because it would only allow for the description of the teacher (subject) and the teacher's participation in associated learning activities for students in the classroom; however, Vygotsky's version does not allow for the mediating act of integrating instructional technology with consideration of the full range of social and cultural interrelationships that impact the teacher, instructional technology, and the classroom (see Engeström, 1987; Kaptelinin & Nardi, 2009; Yamagata-Lynch, 2010).

CHAT-Version 2: Leontiev

Vygotsky's contemporary, Leontiev, set out to further develop and modify Vygotsky's work. Leontiev is the creator of the activity framework, based on his

concepts of analysis of the developmental transformations of the human mind or psyche and the development of the key analytical tool used in his historical analysis, which is the concept of activity (Kaptelinin & Nardi, 2009; Leontiev, 1978). Kaptelinin and Nardi (2009) pointed out that Leontiev elaborated on a large portion of Vygotsky's work and developed some of his major ideas "into a system of concepts and principles known as activity theory" (p. 50). Leontiev continued Vygotsky's work and then created something more, the activity theory, which is still a major component of CHAT today.

Activity theory (AT) is more like a framework that considers an entire system, work, or organization rather than just an individual. AT theorists consider history, culture, artifacts, motivations, and the complexity of reality within a system (Kaptelinin & Nardi, 2009; Leontiev, 1978). AT involves a unit of analysis, or activity system that pertains to an object, a collective, a community, a division of labor, culturally mediating artifacts, signs or tools, and rules. Of those components, Leontiev believed that three aspects of culture have the greatest impact on the human mind: the division of labor, language, and tools (Kaptelinin & Nardi, 2009; Leontiev, 1978). Also, he suggested that tools are the mechanism that transmits human experience from generation to generation and that the structure and usage of a tool change the arrangement of human interaction with the world (Kaptelinin & Nardi, 2009). Leontiev thought that by having a tool and incorporating it into activities, people would also acquire cultural experience. The use of tools is connected to other factors that influence conceptual and mental development, such as language and the division of labor. Thus, throughout human development and lifespan, a person learns and acquires complex concepts from their culture. When a

human being participates in a socially divided work activity, their actions are normally motivated by one object and directed by another (Kaptelinin & Nardi, 2009).

Kaptelinin and Nardi (2009) concluded that Leontiev's activity theory contested the traditional assumption that analytical thinking purports that to make an inference about an activity, one must first understand the subject and the object in isolation of each other. This variation of activity theory, created by Leontiev, focused on studying the object of activity to understand the motivations of the individual, or subject, in collaboration with each other (Al-Ali, 2021; Engeström, 1987). For example, the "subject" is the teacher or group of teachers in a school system, and the main goal is to educate students. The teacher or teachers can enter "the activity" with various motives such as employment, job security, or to grow engaged student learners. The "object" is academic achievement, and the "collective tool" used by the teacher to accomplish the task is instruction or learning activities. Within this complex activity system, the motive of the teacher is for the students to achieve or learn in the classroom and within the school (community). The motives of the other stakeholders (administrators, parents, and students) would seem to be the same, student academic achievement, but the other stakeholders' motives could differ or oppose those of other stakeholders, including the teacher. So, a researcher would need to consider two objects, an objective and subjective one within an activity construct, and the researcher would need to consider each along with the core operations that happen for a school or its classrooms to run. Leontiev's version focused on the subject (teacher or teachers) as a part of the community while providing perspective on the relationship, collaboration, and interactions between the

greater community (the school system, neighborhood, or city), the objective goals, the outcome, the rules and the division of labor amongst the stakeholders within the community (Barrett-Tatum, 2015; Trust, 2017).

The second version of CHAT is hierarchical, built on the notion that the group or individual (i.e., subject) thinks, acts, and learns concerning the community, rules, and the division of labor and how the three are interconnected (Barrett-Tatum, 2015; Trust, 2017). Leontiev (1978) proposed that in activity theory, the properties of the subject and the object did not exist before or after the activity, only when the activity was enacted. As explained by Kaptelinin and Nardi (2009), in activity theory, the relationship between the subject and the object is not symmetrical, and all activity stems from the subject and its interactions; yet, both the subject and the object have agency, or the ability to produce effects. For example, in a school, each stakeholder has individual and collective goals and tasks that pertain to success. The teacher's goal is for the students to learn and achieve academic success via learning activities, instructional tools, proper learning environment, and sound instruction, to meet the socially accepted criteria for success for teachers. Students want to pass to impress their parents and progress to the next grade level by completing schoolwork and passing assessments. Leontiev's (1978) research suggested that while all parties want success in the school community, their individual goals and actions to achieve success can cause a disconnect that could spark multiple outcomes. For instance, a teacher wants students to learn and is willing to use instructional technology to achieve the goal. The school or administration, along with the students, want academic achievement and support the use of instructional technology in the classroom. However,

if the teacher's interactions with the instructional technology are positive, negative, or a combination thereof, the adaption or implementation of the object varies. Some teachers may fully integrate the object and infuse it with the curriculum and instruction; some may only use it for data entry, research, or communication purposes; and some may not use it at all.

Although Leontiev's version of CHAT enhances Vygotsky's version, it is considered incomplete. Through the addition of tools, language, and the division of labor, Leontiev's version of CHAT expanded upon Vygotsky's basic ideas, but Leontiev's version minimally explains why an activity may change based on the presence or lack of other people or cultural concerns. With this second version of CHAT, the definition of activity became more evolved and narrower. The subject's activity is always social, but not necessarily collective; the object of activity may not be collectively shared but is individual and also related to the subject's motive (Hardman, 2007; Kaptelinin & Nardi, 2009). The definition of activity with the second iteration could be a limitation for the current study because the scope of the context is still not wide enough based on this version in terms of collective subjects and objects and their interactions and internalizations and analyzing multiple activity systems. In other words, with the second version of AT, there is one subject, object, set of operations, division of labor. This version of CHAT acknowledges that there is a social and cultural dynamic. However, it still does not solve the problem of how a researcher should address or describe the interrelationships between the entities within the activity system (teachers and

instructional technology) and the unit of analysis (the influence of teachers on the implementation of instructional technology).

CHAT-Version 3: Engeström

Each version of CHAT arose based on the limitations of the prior version, but each new version does not negate the earlier versions. Instead, each new version added a new layer of interpretation. Engeström (1987) designed the third, and most recent, major version of the theory. With this version, Engeström incorporated Mikhail Bakhtin's notions about language and speech as being inseparable from social and historical factors (as cited in Engeström, 1987) and Leontiev's concepts of activity, action, and operation as incorporating many activity systems for analysis, allowing for diversity and dialogue to function within the whole (Engeström, 1987; Engeström & Sannino, 2012; Sannino & Engestrom, 2018). The third version of the theory allows for the analysis and joining of two activity systems that strive toward both collective and individual objectives (Barrett-Tatum, 2015). However, the newer version comes with potentially four types of internal contradictions or tensions that trigger a change in an activity system concerning the subject: internal to one or two elements, internal to one or two objects, or two activity systems (Trust, 2017). In other words, we cannot think of language in isolation, but rather consider, instead, that it is influenced and reflects many diverse concerns that lend to varied and deep discourse for the analysis of activity systems collectively and independently. Conversely, the most recent variation of CHAT is susceptible to multiple internal factors that can significantly influence data collection, analysis, and the outcome of the research. Barrett-Tatum (2015) stated, "CHAT allows a glimpse at a larger picture

of past and present and culture and history to examine a direction for the future, and thus should be considered as research that can lead towards informing curriculum reform" (p. 5).

Although key elements of all three versions influenced my analysis of the collected data, I focused on the third version for this research study to analyze and join the activity systems (each teacher and his or her environment serve as an activity system within each school). It allowed me to describe and analyze each participating teacher, cultural mediation tools, division of labor, and the commonalities or potentially shared perceptions and reasons for adopting or not adopting instructional technology for instructional purposes. By using the third iteration, it permitted me to describe and analyze the activity settings (the teachers' classrooms) one at a time to determine how or if the outcome would be achieved. Some of the internal contradictions (teachers' attitudes or perspectives conflicted about adopting the innovation or the role of school culture or the influence of the environment) pertained to the individual and collective goals, tasks or activities, and relationships within the system of analysis.

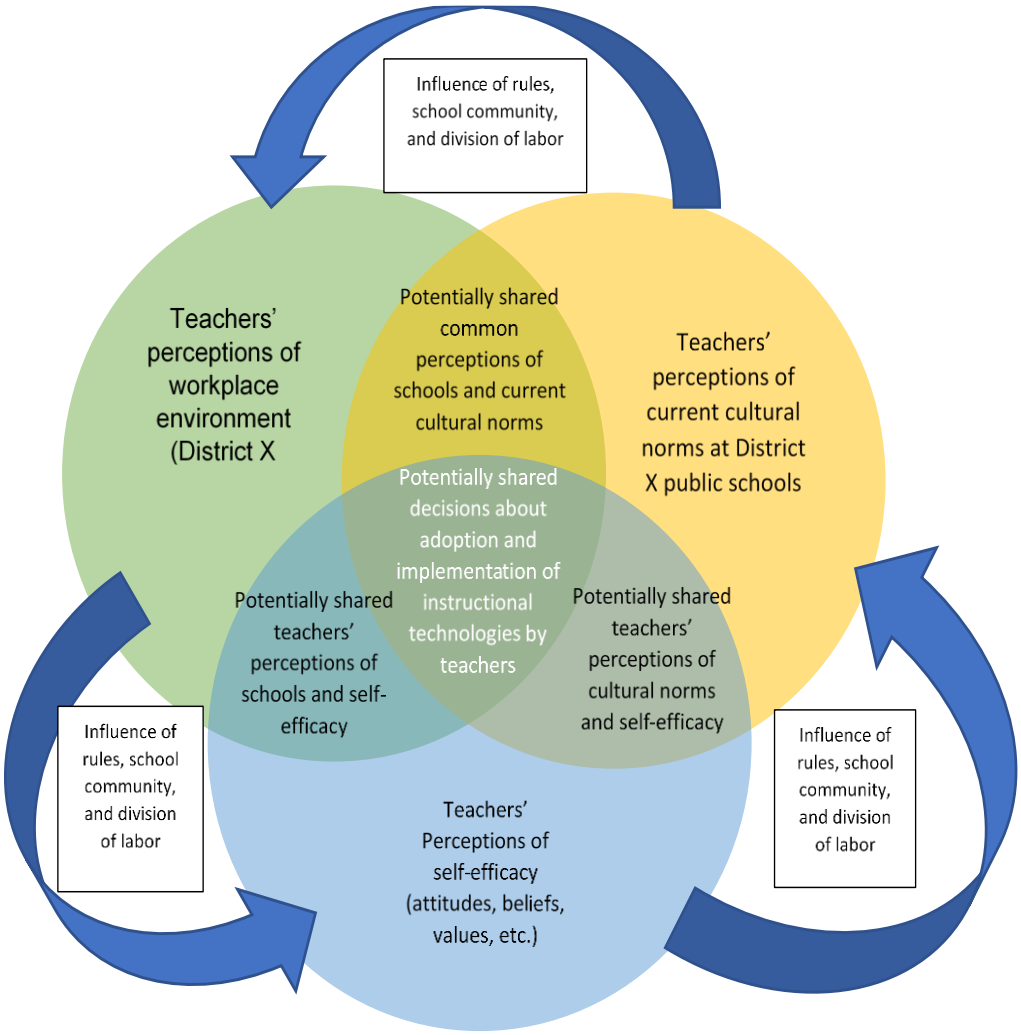
Conceptual Framework

Current literature supports the notion that more research is desired and needed on the influence of individual teachers on implementing instructional technology in the classroom globally (Depta, 2015; Lim, 2019). The literature does point out that CHAT and CBAM as frameworks have been used extensively and, in many variations, to derive answers to various research questions related to technology implementation decision-making (Lim, 2019; Liu & Szabo, 2009). Furthermore, current literature reported that if

teachers' perceptions and attitudes shift, then learning approaches could shift, and concerns like the achievement gap, academic achievement, and teacher centered instruction could be diminished (Depta, 2015; Liu & Szabo, 2009). The image in Figure 3 is an originally conceived diagram of the components and relationships present in the third iteration of CHAT, which was used for this study.

Figure 3

Diagram inspired by Engeström's (1987) version of CHAT



CHAT is a construct that allows the researcher to understand better the mutual influences found among the subject, object, rules, division of labor, and community in each activity system to better understand how language, perspectives, and potential shared goals and outcomes of networks of interacting activity systems (each circle is a system) influence one's reality or understanding of a unit of analysis. The unit of analysis, in this instance, is the influence of teachers on the implementation of instructional technology. The green, blue, and yellow circles represent the components of the activity system that comprise the unit of analysis, each influencing component overlapping with two other activity system components. The arrows illustrate how the rules, school community, and division of labor at each school influence the teachers on implementing instructional technology in the activity system. This diagram aids the researcher in better understanding how teachers' perceptions of the public schools of District X, cultural norms, and perceptions of self-efficacy can progress or be impeded by complex social events in an academic environment. Also, taken in multiples, this diagram illustrates how multiple activity systems form a community of multiple teacher perspectives, cultural norms, social factors, and greatly varying influencers.

CHAT has been used frequently to study the learning and practice of educators and other professionals, yet "there has been no systematic effort to synthesize this literature and the sizable amount of knowledge accumulated by CHAT scholars (Lim, 2019, p. 332). Using CHAT enabled me to use a "framework that will guide research inquiries, afford access to a body of empirical knowledge that has used germane theories" and permitted me to contribute and expand on the work of other CHAT researchers, and

not regurgitate prior research (Lim, 2019, p. 332). CHAT, as a methodology, permitted me to inquire, explore, and analyze the "real-world activities and address issues of complexity" (Lim, 2019, p. 333). Lim (2019), in his review of CHAT research, discussed multiple qualitative and quantitative studies leading to a better understanding of "how interventions worked in particular contexts to produce particular outcomes" (Lim, 2019, p. 333).

This study used a conceptual framework that is partially comprised of CHAT, which was used as the foundation of the framework for analytical purposes. Additionally, the Concerns Based Adoption Model (CBAM) was used for data collection and analysis (Hall & Hord, 2011). CBAM originated at the University of Texas at Austin by the Research and Development Center for Teacher Education (RDCTE) to research individual teacher's attitudes connected to change (Hall, 1976; Hall et al., 1973). RDCTE wanted to assess and describe the personal aspect of change and find strategies to address how teachers perceive and react when implementing innovations and instructional practices (George et al., 2006; Hall & Hord, 2011). CBAM is a framework for exploring the concerns and perceptions of individual teachers as they evolve when introduced to innovations, programs, processes, and instructional practices in their schools (Hall et al., 1973). CBAM is an empirically grounded theoretical model for describing, explaining, and contrasting the change process teachers go through when implementing new technologies or instructional practices (Hall et al., 1979; Hall & Hord, 2011; Hall et al., 1973). CBAM was important for this study for collecting and analyzing collected data using two of its diagnostic tools (George et al., 2006; Hall & Hord, 2011).

The innovations have varied greatly between innovative products and processes. Researchers who examined teachers' affective responses to the change process in schools have drawn upon Hall et al. (1979) CBAM. This data collection toolset provides insight into the concerns' users, potential users, and even nonusers experience when confronted with an innovation adoption (Hall et al., 2006; Hall & Hord, 2011). CBAM researchers have used the CBAM framework to explore various innovation adoptions, from innovations such as mobile or m-learning in universities in Saudi Arabia (Mohammed Al Masarweh, 2019), school-based assessment (Majid, 2011), and active learning (Myers et al., 2012) to mathematics reform adoptions (Charalambous & Philippou, 2010) and ebook-curriculum implementation in higher education (Min, 2017). Several CBAM applications were applied to explore teachers' use of the Internet and instructional technologies in the classroom (Liu & Szabo, 2009; Ranjdoust et al., 2012; Samiei & Laitsch, 2010). Also, while the studies identified above used all three components of CBAM, some international studies have used only one, such as the Levels of Use (LoU) Interview protocol applied by Jordanian universities to define e-learning levels of use by their faculty members (Matar, 2017). Dissimilar to the Matar (2017) study, this qualitative study used two of the diagnostic tools of CBAM, the SoC Questionnaire and the LoU Interview Protocol for a P-12 teacher population in District X in the United States.

The CBAM framework was used to explore, analyze and describe the concerns, levels of use, and perceptions of individual teachers when introduced to innovations, programs, processes, and instructional practices in their schools (Hall et al., 2006; Hall et

al., 1973). CBAM also focuses on the facilitation of change and how the comprehension of concerns of a population can support innovation adoption by describing them when implementing new technologies or instructional practices (Straub, 2009).

CBAM has two diagnostic components that were used for data collection and analysis. They are, first, SoCQ that was provided to each interested teacher within the study site population to determine his or her concerns about instructional technology and, thereby, to determine which teacher participants from that target population would become part of the sample to be interviewed. Secondly, selected teacher participants also participated in the Levels of Use (LoU) interview, and the interview data was used to address the research questions. CBAM has an interview protocol that includes open-ended statements and questions to assist with determining the range of use of instructional technology.

Literature Review Related to Key Concepts and Variables

In this section of Chapter 2, the key variables of recent studies are discussed and reviewed in six subsections. They include:

1. Instructional Technology and Instruction
2. Teacher Agency and Social and Professional Constraints
3. Teacher Agency and Environmental and Personal Constraints
4. Teacher Focused Approach to Change
5. Instructional Environment, Culture, and Climate
6. Student Engagement and Motivation

For each variable, a rationale is provided for its relevance to this generic qualitative study, the concerns and background surrounding each, and an explanation detailing how the variables are considered beneficial because of additional research. A synthesis of the reviewed research provided a guide to the approach used in this study. These six subsections, and the literature associated with them, and the theoretical framework aided in establishing the relevance of the problem and selecting the conceptual framework.

Instructional Technology and Instruction

Instructional technology's definition can change based on the perception of the user and the user's intent. For this study, instructional technology was defined as tools or resources used in the classroom to aid with assessments, instruction, and teaching (as opposed to merely delivering) course content (see Findlay-Thompson et al., 2015). These instructional technologies include computers, tablets, clickers, software, programs, and digital and internet resources used by teachers to engage and aid students in learning. In line with Stephen and Plowman (2013), the three types of learning that instructional technology should be used are operational, curricular, and socioemotional. According to Jack and Higgins (2019), a snippet of literature from 1996 to 2016 varies in terms of the definition and usage of instructional technology and "they suggested that children's home experiences were likely to support all these types of learning, but in instructional settings, the learning was more likely to be limited" to either operational or socioemotional (p. 5). This disconnect is concerning because it reveals the lack of implementation of instructional technology in instructional settings, such as the classroom, computer lab, or library (Jack & Higgins, 2019), that is, during actual instruction within the classroom.

Jack and Higgins (2019) pointed out that instructional technology has a positive influence on students when it is used with "adults or more experienced peers" (p. 5). However, teachers tend to interact with students differently when they use instructional technology, and the amount of interaction tends to be limited by the teachers' lack of efficacy in using instructional technology.

Cuban (2013) concluded that there is a troubling trend that has been arising in the contemporary American classroom. Teachers seem only to embrace modern "Mechanical and automated instructional aids" (Cuban, 1986, p. 2), which today might include I-pads, interactive whiteboards, and computers as means to deliver a lesson. Cuban (2013) also noted that merely "importing electronic technologies into classrooms over the past century (e.g., film, instructional television, desktop computers, interactive whiteboards, and laptops) also has not substantially altered teacher and student daily routines and relationships" (p. 9). Teachers have rarely altered their instructional practices in decades, and the notion that incorporating current academic technology would transform archaic, teacher directed instruction into "new student-centered pedagogies have become a cliché" (Cuban, 2013, p. 10). When teachers are not using or integrating instructional technology for instructional purposes, students' exposure to instructional technology is limited, as is the potential for student engagement with content and each other in educational settings (Cuban, 2013).

There is a connection between the use of instructional technology by teachers for instruction and student academic achievement. According to DePountis et al. (2015), during "the last 30 years, the technology boom has produced an abundance of tools to

assist with learning and teaching" (p. 266). Stewart and Stewart (2013) proposed "support[ing] the idea that pedagogy should be put first and technology second," even though most instruction or teaching lacks innovation (p. 1094). Also, Stewart and Stewart (2013) proposed that when technology is incorporated into instruction and teaching, effective methodologies need to be used to integrate technology during high-quality instruction to diminish student disinterest or instructional technology being used for non-academic purposes. Chien et al. (2016) suggested that there is no clear explanation as to how or why instructional technology effectively enables academic learning and engagement to occur. Similarly, Cuban (2013) had also questioned if there was enough evidence of the operations and relationships that exist in classrooms between teachers, students, instructional technology, curriculum, test scores, graduation rates, and instruction.

Numerous researchers have stated that with many instructional initiatives and reforms, technology has been adopted by some teachers or school systems, but there is no consistent data that supports that masses of teachers want to adopt or integrate instructional technology (Bakir, 2016; Burke et al., 2018; Christensen & Knezek, 2017; Clark & Mayer, 2016; Cuban, 2013; Hughes et al., 2017; Khlaif, 2018; Knight, 2013; Mayer, 2011). Instructional technology is perceived by some researchers to have the potential to improve the quality of instruction, student learning, and performance (Constantinou & Iannou, 2016; Latulippe, 2016; Roush & Song, 2013). Latulippe (2016) stated that "studies suggest that using […] technology along with peer instruction can improve student exam scores" (p. 604). Constantinou and Iannou (2016) suggested that

the implementation of instructional technology, like clickers, in instructional settings, can enhance teaching and learning. Also, Constantinou and Iannou believe that "the ability to see how many others have given the same answer, makes both students and instructors fully aware of the level of understanding of the course content" (p. 69). As the conceptual framework for this study demonstrated, it was important for the researcher to pay attention (analyze, describe, and reflect) to this type of phenomenon and its connection to how or why teachers choose or not to adopt or integrate instructional technology for instructional purposes.

Teacher Agency and Social and Professional Constraints

When it comes to the implementation of instructional technology, there seems to be contrasting research literature. Social and professional constraints can limit teachers' agency in the classroom. For instance, even though teachers seem in charge of the classroom, some other factors or stakeholders potentially impede individual teacher control and decision-making. These factors or stakeholders include, but are not limited to, administrators, students, parents, and the public. According to Cuban (2013), school administrators or reform policies have focused on changing the teachers' mindset or practices as a fix, and this practice "has been the dominant policy strategy to improve classroom instruction" (p. 8). Some studies reflect that other educational stakeholders, administrators, and educational reformers, for example, are more in control of everything from curriculum to scheduling (Cuban, 2013; Depta, 2015). For example, in a qualitative study conducted in Bolivia, Popova and Fabre (2017) used focus groups to study teachers' implementation of digital technology based on a government initiative. The

longitudinal study used a constraints-driven model to reflect on the barriers teachers faced. During the initial part of the study, the Bolivian secondary subject matter teachers were given laptops and some training from the Swedish Program for ICT in Developing Regions (SPIDER) project. Popova and Fabre (2017) concluded that this was insufficient support for teacher implementation, so the follow-up constraints model project was completed that provided the proper conditions for teachers to adopt technology into daily instruction. The data collected from the project purported that constraints may differ based on the "economy, political situation, available infrastructure and the culture" of the environment or region (Popova & Fabre, 2017, p. 46). As a result of the findings, the "lack of training, appropriate software and hardware, skills in integrating ICT, and technical and administrative support" were the major constraints to teacher implementation and agency, the researchers were able to suggest. Then the government implemented steps to eliminate the constraints.

Teacher Agency and Environmental and Personal Constraints

Not only can teachers' agency in the classroom be limited by social and professional constraints, environmental and personal ones also need to be considered. Some research suggested that many teachers simply opt not to adopt or integrate instructional technology in their respective classrooms due to a perceived lack of knowledge regarding instructional technology or pedagogical preference (Li & Choi, 2014). In other words, a high number of teachers struggle with instruction because of a lack of knowledge or a low level of usage of instructional technology (Siemens et al., 2013; Slavich & Zimbardo, 2012). Furthermore, many teachers do not integrate

contemporary technology in the classroom, preferring traditional teaching methods (Cuban, 2013). As a result, while many educational stakeholders are committed to modernizing and improving American education, the advantages of instructional technology are still not widely integrated (Brown et al., 2015; Cuban, 1986, 2013; Li & Choi, 2014).

Many environmental and personal constraints hinder the implementation of instructional technology by teachers. These include teacher attitudes, the complexity of technology, lack of knowledge, lack of growth mindset, and lack of training for teachers (Petko et al., 2018). Environmentally and socioculturally, teachers do not seem to have an authoritative voice in schools; for example, they appear to lack support or control over policy related to instruction compared to other educational stakeholders such as parents or administrators (Petko et al., 2018). Petko et al., pointed out that accessibility and confidence in the benefits of instructional technology for teachers are a constraint. Such dissimilar descriptions of the influences upon teachers reported within the literature are important, and they lend credence to the significance of this study.

This study assisted in closing a knowledge gap that has been explored limitedly. For over a 100 years, education reform has occurred, and technology has improved and been incorporated into American society at a rapid rate, while, incongruently, the implementation of instructional technology for instruction has not (Cuban, 2013). There are very few studies that have used CBAM and CHAT combined for grades P-12 in an urban public-school setting in the United States. Most have focused on higher education faculty (Ansah et al., 2011; Donovan & Green, 2010; Min, 2017), and most studies were

international (Aihi, 2011; Isman et al., 2012; Matar, 2017; Mohammed Al Masarweh, 2019). To more fully understand how and why District X teachers' perceptions, norms, and internal constructs appear to negatively influence the implementation of instructional technology into instruction within their respective classrooms, it is necessary to research their concerns and levels of use using CBAM. Sardegna and Dugartsyrenova (2014) proposed, after they completed their study of pre-service foreign language teachers' perspectives on the value and usefulness of technology-enhanced learning activities, that technology-enhanced learning activities are "beneficial for bridging theory and practice, enhancing critical thinking, and promoting professional growth" (p. 147). Their study even suggested that teachers learn more about technology and incorporate it into instruction before becoming a teacher. Sardegna and Dugartsyrenova stated that many participants believed that the activities provided opportunities for wide-ranging and diverse interactions, peer feedback, reflection, learner autonomy, a sense of belonging to a professional learning community, fostering a deeper appreciation of technology-infused practices. Without stating it, this study seemed to use some components of CHAT, and its results suggest that my study could be successful.

Using CHAT and CBAM as a blended conceptual and theoretical framework allowed for a deeper understanding of the apparent paradox between the demand, desire, and success of instructional technology when integrated versus the stance of many teachers to not use educational technology for instructional purposes. According to Jones and Moreland (2015), it is important to understand the definition of pedagogical content knowledge, especially when considering how teachers' perceptions and instructional

practices potentially play a role in whether or not instructional technology should be adopted or integrated to improve academic achievement. Also, research data from secondary schools support the notion that pedagogical content knowledge is a complex combination of pedagogy and subject content that involves one's understanding of instruction, learning development, assessments, understanding of how learners learn, and ways to enable effective learning (Jones & Moreland, 2015).

Sardegna and Dugartsyrenova (2014) suggested that if future or prospective teachers, not unlike those in their study, are encouraged to learn with technology before becoming a teacher, they would be more comfortable or at ease with teaching using a variety of instructional technologies to promote active learning. Most of the research surrounding pedagogical content knowledge has pertained to secondary grade levels (grades 6-12) and content-specific areas (English, social studies) of concern rather than "strategies to develop pedagogical content knowledge generally" (Jones & Moreland, 2015, p. 65); moreover, there is minimal evidence that P-12 teachers are taught strategies to incorporate instructional technology in their instructional practices better.

Some scholars believe that teacher preparation, beliefs, and instructional proficiency need to be considered relating to the implementation of instructional technology (Latulippe, 2016; Savasci Acikalin, 2014). Criteria, to determine if a teacher is effective, should be used by researchers like me. According to Jones and Moreland (2015), the criteria should include a teacher having a broad understanding and knowledge of content, subject, and curriculum, have an extensive range of pedagogical tools and strategies at his or her disposal, high expectations for students, know the students,

provide effective and immediate feedback, and recognize student success. Research indicated that if teachers with a depth of pedagogical content knowledge focus on content-specific instruction, instructional learning activities that are differentiated by students' levels of understanding, and then tap into a student's prior knowledge, they should learn and academically achieve (Jones & Moreland, 2015). When a teacher's depth of pedagogical content knowledge is low, a teacher tends to teach with less confidence, and academic achievement for the students becomes minimal (Jones & Moreland, 2015).

A teacher's role in designing and integrating instruction that incorporates instructional technology can influence the teacher's perspective, student engagement, and student achievement (Cviko et al., 2014; Latulippe, 2016; Savasci Acikalin, 2014). According to Cviko et al. (2014), teachers tend to engage in one of three roles during instructional design: executor only, re-designer, or co-designer. Teachers or instructors tend to have a positive perspective on integrating technology into curriculum and instruction depending on the assigned design role, practicality of the curriculum, and a sense of ownership (Cviko et al., 2014). Cviko et al. (2014) altered the discussion by stating in their cross-case analysis of the value of different teachers' roles in the design and implementation of technology-infused instruction or learning activities, "Significant learning gains were found for each teacher role" (p. 68). Cviko et al. concluded that "involving teachers in technology-rich activities positively affected teachers' perceptions and implementation, and that each teacher role contributed to the effectiveness of technology-rich activities" (2014, p. 68). Furthermore, technology-rich instruction and

associated learning activities can still be improved upon when teachers are serving as co- or re-designer, aware of the influence or outcome of each design role and incorporated in deciding which role to pursue based on a comparison of the three roles.

Roush and Song (2013) proposed in their mixed-method study that the implementation of instructional technology for instructional purposes impacted both students' and teachers' perspectives. Their study also suggested that instructional technology requires teachers to plan for a longer period initially but would spend less time planning afterward because they would use the same instructional plan for future lessons with a similar structure. Constantinou and Iannou (2016) proposed in their mixed-method study of technology-enhanced learning in sports education that instructional technology can promote academic performance. Similarly, Constantinou and Iannou (2016) proposed that "metacognition from the use of instructional technology influenced the learning process" (p.70). Constantinou and Iannou (2016) found that the arrangement or learning environment of the class using instructional technology provided an advantage over conventional ones because teachers or instructors were then able to identify student learning concerns while instruction was still happening (Constantinou & Iannou, 2016; Philip & Garcia, 2013; Roush & Song, 2013).

Constantinou and Iannou (2016) then offered that with sports education, "the interactivity with peers and the instructor resulting from the use of instructional technology, influences student engagement and active collaborative learning, which ultimately determines students' learning performance" (p.70). If instructional technology is attributed to students and teachers having more positive attitudes in the classroom or

learning environment because technologies promote engagement and learning, then it is worth further exploration to understand better why teachers may prefer not to adopt or integrate instructional technology, especially when the research supports it being successful in improving academic achievement.

It is important to acknowledge that how teachers implement or incorporate instructional technology into instruction and lesson activities influences achievement and learning outcomes for students. Abuhmaid (2014) stated, “any technology or instructional change is as good as its implementation” (p. 74). Also, teachers’ perceptions of instructional technology influence engagement and learning. Abuhmaid (2014) stated, “the realization of the crucial role of teachers requires providing them with proper training, support, encouragement, and cooperation to implement the new technology effectively” (p. 74). These factors may show up as either concern or affect teachers’ levels of use of instructional technology in the classroom.

Teacher Focused Approach to Change

This study focused on how and why teachers’ attitudes, beliefs, and sociocultural backgrounds influence the implementation of instructional technology that serve as tools for learning or instruction in a classroom setting. Many studies that are CBAM ones were published outside of the United States (Matar, 2017; Mohammed Al Masarweh, 2019) and some inside the United States (Derrington & Campbell, 2015); however, there were no studies found that used CHAT and CBAM together that focused on a P-12 public school system and explored the influence of teachers’ attitudes and actions on the implementation of instructional technology.

Many studies that used CBAM focused on analyzing the adoption of various instructional technologies in higher education or P-12 internationally (Bellah & Dyer, 2009; Derrington & Campbell, 2015; Donovan & Green, 2010; Hollingshead, 2009; Min, 2017; Saunders, 2012; Tunks & Weller, 2009). Many researchers that focused on professors at major universities nationally and internationally may have only used one diagnostic tool, the SoC Questionnaire (Mohammed Al Masarweh, 2019; Ranjdoust et al., 2012), to describe and analyze the adoption of instructional technology. The results of the study "provide indications of other stages that can be used as a benchmark for future comparison on any change in policy, technology, and practices" (Mohammed Al Masarweh, 2019, p. 162). This study used the SoC Questionnaire tool to define the concerns of the faculty and to identify the sample for interviews. The researcher proposed that training and motivation need further consideration to steer the faculty toward the highest level of adoption and usage. According to Ranjdoust et al. (2012), in some countries, Iran for example, instructional technology is not adopted or integrated not because teachers lack the desire or wholly embrace traditional methods, but rather because it is a patriarchal system that does not embrace female teachers receiving further professional development. It is important to note that the Ranjdoust et al. study involved limitations that this researcher did not have, such as female faculty being restricted in terms of professional training and opportunities; and the Iranian study discussed a ranking of faculty (adjunct, associate, assistant and tenured) that this study did not need to address.

Some researchers, like Matar (2017), chose to focus on CBAM's LoU interview tool to describe the faculty members' experiences with learning and engaging the innovation, specifically e-learning. LoU is considered a tool for identifying behavioral patterns and a "model of change in practice," and LoU does not require faculty to transition through all levels of use in a "lock-step growing fashion" (p. 143). The results for the 46 faculty members who were e-learning users illustrated that they were Mechanical users, "having their attentions on the short-term, daily use of the e-learning with little time for reproduction" and they focus mainly on "learning tasks compulsory to use the educational tool" (p. 152). The findings support the notion that teachers are not focused on the benefits of instructional technology or long term and extensive education reform for improving student academic achievement (Bozkurt et al., 2014; Jack & Higgins, 2019; Li & Choi, 2014).

While some studies used only one of CBAM's tools, some used multiple tools of CBAM pertaining to P-12 grade schools. Samiei and Laitsch (2010) used CBAM and focused on elementary school teachers in British Columbia, Canada. Their study explored the teachers' skeptical perspectives on integrating information and communication technology versus instructional technology in schools despite the flood of available technology and associated funding for staff. Samiei and Laitsch (2010) proposed that with consistent interventions, such as professional development, technological support, and access to the technology, implementation would more likely happen. Samiei and Laitsch also note that it is vital that teachers be willing and involved in the implementation of any instructional technology. This study assisted me with deciding to

use CBAM and its components, especially since my study focused on teachers, their concerns, and their willingness or lack of willingness to adopt and integrate instructional technology. Although this study happened in another country, and the focus is slightly different in terms of technology, the similarities of the subject, education, and perspectives are considered.

Research findings of American studies that used CBAM varied in focus (Liu & Szabo, 2009; Min, 2017). The Liu and Szabo (2009) study used CBAM and its tools to repeatedly study teachers and their decisions to integrate instructional technology in the classroom. The repeated, cross-sectional longitudinal trend study supported the notion that when technology is integrated, "[it] has the potential to change the way we think about how teachers teach and students learn" (Liu & Szabo, 2009, p. 5). Liu and Szabo recommended that "the use of technology in classroom teaching resides in the fact that technology can take the place of real-life experiences through simulations, games, discovery, and problem-solving" (p. 6). Like Liu and Szabo, Min (2017) focused on understanding teachers' concerns about integrating new instructional technology. However, it focused more on teachers who initiated curricular change independently and compared its findings to earlier research that used the SoC Questionnaire in CBAM to identify the limitations of the research and to provide suggestions for future research. The report proposed that CBAM is highly effective when it comes to addressing the personal concerns but seems to forget that when an innovation is being integrated, the interactions that the teacher has with all academic and community stakeholders need to be considered. The Min study identified two gaps, one being that there are very few studies that

challenge the developmental conventions of the SoC Questionnaire of CBAM, and the second gap is that there is even less qualitative research that focuses on teachers' concerns on integrating instructional technology. There were many limitations to this study. One, the sample of instructors was not chosen randomly, and generalizations that could be drawn from the findings may be potentially ambiguous. Min (2017) "suggested that further research is necessary to explore more idiosyncratic traits that might promote or hinder teachers' change processes toward either mandated or initiated innovation and the ways the traits interact with external contextual factors" (p. 38). Their research supports Cuban's (1986) belief that even though teachers have access to the technology and funding is available for purchasing and training; teachers seem to choose more traditional approaches of instruction still. In my qualitative study, I attempted to determine if this notion is true regarding P-12, public school teachers in District X.

Most studies referenced above concluded that their findings support the notion that more research studies will happen, and they hoped that the implementation of instructional technology would be less hectic. My study used CHAT in conjunction with the CBAM tools to determine teachers' concerns and levels of perceptions relating to the implementation of instructional technology, but my study was not longitudinal or cross-sectional.

One study did not encourage using CBAM or CHAT. Depta's research (2015) used activity and systems theories to study administrators' perspectives on instructional technology instead of teachers' perspectives. Like some of the other studies, the findings included diverse participants' responses, but this research added another lens. Depta

(2015) suggested that the implementation of instructional technology in schools was more successful when the administrators had a vision, and all stakeholders embraced the vision. This notion is a factor I considered when looking for patterns and trends in responding to the research questions related to teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for using instructional technology in their respective classrooms.

The literature illustrated that teacher focused approaches to change are beneficial, and these studies, along with CHAT and CBAM, assisted in exploring the research questions of this study that focus on teachers. The role of the teacher in the implementation of instructional technology is extremely significant because much of the decision-making regarding how the technology is incorporated and used in the classroom is commonly the responsibility of the individual teacher (Warner & Myers, 2013). More importantly, teachers have a substantial preference in determining whether an instructional technology and which one is used to achieve educational and instructional goals. Therefore, attitudes that teachers have about technology in the classroom are central elements in the educational change process and would appear to affect how technology is ultimately integrated (Butler, 2012; Donovan & Green, 2010; Hall & Hord, 2011; Majid, 2011). While the positive outcomes of integrating instructional technology in American instructional settings have been accepted and documented (Isman et al., 2012; Mahnegar, 2012; Solomon & Makara, 2010), less research exists regarding the concerns of teachers, their levels of instructional technology use and the teachers'

responsibility for its implementation. These issues can be analyzed using CHAT after data collection using CBAM.

The successful implementation of innovations and instructional technology relies on each teacher's comprehension and understanding of the value of such innovations to facilitate and improve their students' educational experiences, and it relies on the analysis of each teacher's mindset as viewed from the key concepts of CHAT (Hall & Hord, 2011; Kaptelinin & Nardi, 2009). Without teachers who can integrate technology, students' contact with innovation is limited and unequal (Jack & Higgins, 2019). Consequently, the institutionalization of technological innovations, such as instructional technology, is dependent on the types of support teachers receive from the school system or other educational stakeholders when implementing technology-enhanced practices in their classroom instruction (Postholm, 2008; Ramírez, 2011). Even if teachers have positive views towards and personal beliefs in the instructional potential of technology, those alone are not a substantial enough signal that implementation of technological innovations would become universal in the instructional setting (Ertmer & Ottenbreit-Leftwich, 2010; Jack & Higgins, 2019). According to Engeström and Sannino (2012, 2018), using CHAT, analyses of the cultural, historical context, contradictions, and the zone of proximal development of the teacher's activity systems would need to occur.

Instructional Environment, Climate, and Culture

The activity setting of CHAT is connected to the sociocultural analysis that occurs during a study like this one and because "it is the setting that provides the context in which activities take place" (Yamagata-Lynch, 2010, p. 24). The learning environment,

which includes but is not limited to the classroom, the community, the home, the world, life activities, and interactions, and the mind, must be carefully considered when examining the influence of instructional technology, instruction, the achievement gap, student engagement, motivation, and academic achievement of a student learner to more fully understand how and why teachers' perceptions, norms, and internal constructs influence the implementation of instructional technology into their respective classrooms. It is important to reflect on the significance and influence of the learning environment or classroom because it impacts instruction, the mood of the students and the teacher, and academic achievement. Technologically enhanced learning environments created with both the teacher and students in mind provide opportunities for successful instruction, academic achievement, and learning for students (Slava Kalyuga & Liu, 2015).

Additionally, the learning environment must be considered when exploring the connection between teachers' perceptions and actions and the implementation of instructional technology, as noted in the purpose and research questions of this study. When observed via CHAT, the learning environment can shift from the teachers' minds, their homes, schools, communities, social settings, religious places of worship and also be influenced by the surrounding culture and history of all those places in which expansive learning can occur (Engeström & Sannino, 2012, 2018; Kaptelinin & Nardi, 2009). Research also suggests that teachers, along with school administrators and other educational stakeholders, should be involved in the designing of the instructional environment, especially when incorporating technology to enhance instruction (Al-Ali, 2021; Cober et al., 2015). When teachers can participate in the design process, the

instructional inputs and outputs are more conducive to promoting academic achievement and instructional success (Cober et al., 2015; Slava Kalyuga & Liu, 2015). Cober et al., concluded that when teachers are considered as more than just facilitators of instruction and are seen as the preparers, planners, and actors of instruction, then more intentional and disciplined flexible instruction and learning can occur. It is important to understand that technology alone is not the impetus of successful learning and instruction; however, when instructional technology is used to provoke learning and knowledge building that academic achievement can occur (Slava Kalyuga & Liu, 2015).

Teachers should be considered and involved in school district-wide technology implementation. Schools and their leadership should share their thoughts and decision-making about the implementation of new technologies with teachers, and they should facilitate the implementation of new technology when sharing their vision and goals for the school (Abuhmaid, 2014; Hofmann et al., 2021). The research questions also address how teachers perceive the role that American culture plays in identifying and encouraging the use of instructional technology in the classroom. Teaching and learning in urban learning environments or activity settings are not only impacted by poor academic achievement, but by poverty, race issues, and adverse community, societal, health, and developmental and behavioral problems or outcomes, such as truancy, teen pregnancy, and mental and physical health concerns (Dele-Ajayi et al., 2021; McCoy & Bowen, 2015).

With potential impediments to teacher control within the classroom acknowledged, it seems appropriate to discuss potential ways to address those concerns.

Kaniuka (2009) proposed that collaboration between teachers and innovation is necessary because even if it has been demonstrated that innovation, like education technology, is successful with improving academic achievement, school systems, and most teachers historically and consistently choose to adopt traditional methods of instruction or the status quo rather than use options like instructional technology even though it that may be more effective. The successful implementation of innovations or instructional technology relies on each teacher's comprehension and understanding of the value of such innovations to facilitate and improve their students' instructional experiences (AIR, 2017; Hall & Hord, 2011).

Yamagata-Lynch (2010) pointed out that socio-culture and climate influence the actions and perceptions of teachers regarding instruction, student academic achievement, and the role American culture plays in identifying and encouraging the use of instructional technology in the classroom. According to Steinmayr et al. (2018), most school systems develop curriculum and cognitive goals in connection to academic achievement, standardized test scores, and how they are used to determine a student's eligibility for acceptance into a four-year college or university or career development program.

When attempting to respond to the research questions and when considering external factors that could impact this study, it was important to acknowledge and address how teacher's use of curriculum and their cognitive goals. Since academic achievement is a curriculum goal of teachers, there needed to be some discussion surrounding the achievement gap, especially when the activity setting or classroom is an urban one.

Potentially, the culture and climate of instruction and teacher practices could affect the achievement gap. Webb and Thomas (2015) concluded that "the achievement gap refers to the inequalities in academic performance between groups of students generally categorized by socioeconomic status (SES), race, ethnicity, and gender" (Strand, 2014, p. 1). Not only does the achievement gap reflect racial and socioeconomic concerns amongst African Americans and whites, but it also shows similar disparities about Hispanic and Asian Americans. Around the 1960s or 1970s, the achievement gap reflected that Blacks performed over fifty percent lower academically than Whites who graduated from high school (Webb & Thomas, 2015). Historically, the gap appeared greatest in math and reading scores amongst both African Americans and Caucasians. Around 2009, the national assessment data suggested that the gap might be widening (Webb & Thomas, 2015).

Student Engagement and Motivation

Student engagement is central to instruction and academic learning. Montgomery et al. (2015) suggested that "student engagement is perhaps the single most important factor in determining successful learning" (p. 658). Student engagement (behavioral, cognitive, and emotional) cannot just be considered the time and effort a student contributes to learning; it is more complex a concept than that (ChanMin Kim et al., 2015). According to Montgomery et al. (2015), "student engagement is a multifaceted construct that encompasses several dimensions, including psychological (e.g., self-efficacy, the individuality of the learner) as well as sociocultural perspectives (e.g., students' cultural and linguistic background)" (p. 658). Research supports that, especially

when dealing with instructional technology and its usage to instruct that student engagement needs to be an intentional and multifaceted construct offered in different formats and constantly considered. Also, because of the independence and flexibility allotted students with technology, individual student motivation, and responsibility are desired and required (see also Chan Min et al., 2015; Montgomery et al., 2015; Shea et al., 2015).

Teachers should consider that the instructional strategies and activities implemented in the classroom could influence student engagement that may affect the student via attendance; also, the teacher may adapt or modify course content or subject matter if it is appealing to students. Three factors should be considered to measure student engagement. According to Dixson (2015):

> The three factors associated with successful course design and students reporting high levels of learning and satisfaction were (1) frequent and quality interaction with instructors, (2) a dynamic discussion (interaction with classmates), and (3) a transparent interface (easy navigation). (p. 145)

It would be ideal, or there would be proper self-efficacy if a student could solely and successfully just have the instructional technology or a computer at their disposal, engage, learn, and achieve academically alone. That is not the case; students need both teacher and "social presence," real world, real people connectivity as well to learn and achieve (Dixson, 2015, p. 145).

Instructional technology can assist teachers in engaging, connecting, and promoting learning for students. Montgomery, Hayward, Dunn, Carbonaro, and Amrhein

(2015) pointed out that it is critical to note that students' increased access to technology in the classroom needs to be interrelated to instructional and assessment goals to create lifelong learners and pre-professionals. Instructional tools, like instructional technology, can assist educators with pairing technology and various modes of instruction to sustain student engagement for culturally responsive and diverse learners (Montgomery et al., 2015).

Student engagement in an ideal instructional setting links student performance and academic achievement. If a school system or classroom actively engages students, student performance and assessment data need consideration and review to determine if academic achievement on the Common Core State Standards (CCSS), state, national, or local learning goals and outcomes have been obtained (Shea et al., 2015). Student engagement happens when motivation needs to be transferred into engagement, especially when both concepts do not exist in an instructional setting. To aid this transformation, educators should assist or support "the effort and metacognition regulation" of students (ChanMin Kim et al., 2015, p. 262). Metacognition regulation occurs more successfully "when students engage in the learning tasks that are (a) perceived easy to execute and (b) interesting and enjoyable" (Chan Min et al., 2015, p. 263). This transformation from motivation to engagement can also lead to self-efficacy.

When a school system uses technology, it is assumed that teachers have expectations as to how that technology would impact and influence learning, instructional outcomes, and academic achievement (Cetin-Dindar, 2016; Nasibullov et al., 2015; Shea et al., 2015). When students are engaged in learning, they are often, but not always

motivated to learn, perform, and obtain academic achievement (Cetin-Dindar, 2016; Nasibullov et al., 2015; Shea et al., 2015).

Technology and instructional tools engage students and motivate them (Cetin-Dindar, 2016; Nasibullov et al., 2015; Shea et al., 2015). Instruction should be driven by what motivates students to want to learn, and it reflects the amount of effort exhibited or the lack thereof by students and teachers to academic achievement. Students tend to be motivated or inspired to participate, achieve, or learn by factors such as self-esteem, home life, community, personal, social, or political concerns, parents, peers, mental or physical stimuli, activities, socio-economic status, nourishment, or a show of concern. External and internal factors (mental, physical, or environmental) that impact and influence a student's desire to learn or achieve or participate academically are considered student motivation (Al-Ali, 2021; Korb, 2012).

Teachers and instruction provide different modes of academic interaction or engagement that can promote diverse forms of motivation for students in the classroom. According to Chan and Wang (2016), different forms of interactions underlie different forms of motivation that are also attributed or linked to academic outcomes. ChanMin Kim et al. (2015) concluded that "Engagement and motivation are not the same, but motivation can be transformed into engagement with the proper design of support" (p. 261). During the past 20 years, there has been an increase in the use of electronic (digital) instructional technology, virtual instruction, and blended learning. Even though many students are eager to use these phenomena, there is no guarantee that they will automatically be engaged or motivated. According to ChanMin Kim et al. (2015),

"Motivation is critical in learning" and "motivated students do not always engage in learning"; educators and researchers need to consider that "motivation to learn is only a desire to be involved in activities for learning" (p.261). Motivation is a dynamic to consider as I research teachers' perceptions, attitudes, and instructional actions. It would seem that "mindful engagement in those learning activities" by students could then lead to "outcomes such as achievement and motivation underpin engagement" if teachers chose to adopt or integrate instructional technology in the classroom (ChanMin Kim et al., 2015, p. 261).

Methodological Considerations

The generic qualitative design was used to respond to the research questions and to address the research problem. Based on the key variables and the associated literature reviewed (Bush, 2017; Cline, 2016; Croftcheck, 2015; Durley, 2016; Matar, 2017; Mayfield, 2016; Min, 2017; Mohammed Al Masarweh, 2019; Ray, 2016), many researchers have used CBAM and its diagnostic tools for educational research. The literature reviewed and discussed supports the notion that CBAM is a versatile conceptual framework; CBAM and its tools can be used for qualitative, quantitative, and mixed methods research (Dele-Ajayi et al., 2021; Matar, 2017; Min, 2017; Mohammed Al Masarweh, 2019). While many of the studies reviewed supported mixed methods or quantitative research designs (Constantinou & Iannou, 2016; Min, 2017; Mohammed Al Masarweh, 2019; Philip & Garcia, 2013; Roush & Song, 2013), neither method was strongly considered for this study. Both mixed methods and quantitative research designs were not used because they are too expansive, can be time-consuming, require additional

resources, and tend to be too complex for a novice researcher (Creswell & Creswell, 2017). For those reasons, CBAM's SocQ generated the criterion to determine the sample for the LoU interviews to collect data to be qualitatively analyzed and interpreted. Also, while CBAM tools have been used for many mixed-method and quantitative studies, CBAM has been used to conduct qualitative studies (Matar, 2017) successfully.

Summary and Conclusions

The information and conclusions presented in the literature review covered many topics about precursive research studies, variables that influence teachers, and areas of concern to be considered about the research approach and methodology. This chapter also detailed why CHAT and CBAM were chosen as the theoretical and conceptual frameworks for this study. CHAT was used to understand better how public school teachers' decision-making and actions influence the implementation of instructional technology, while CBAM's LoU was used by the researcher to analyze, describe and collect data to understand better how and why teachers' perceptions, experiences, and beliefs influence the implementation of instructional technology in the classroom. CBAM's SocQ was used to help to determine the sample and also suggest codes for data analysis. The literature presented confirmed that instructional technology tends to engage students and their learning if adopted and implemented by teachers.

This chapter provided an overview of the variables that influence teachers: instructional technology and instructional approaches, teacher agency and social and professional constraints, environmental and personal constraints, teacher focused approach to change, instructional environment, culture and climate, and student

engagement and motivation. These influential elements all contribute to teachers' perceptions and decision-making. The learning environment or activity setting needs to be considered concerning the implementation of instructional technology in the District X school system. The literature reflected that instructional technology is more widely adopted in higher education and the adoption and implementation have aided in improving academic performance and student engagement, but teachers in P-12 setting are using instructional technology for as an aid and not as an instructional tool (Bozkurt et al., 2014; Jack & Higgins, 2019; Li & Choi, 2014).

While colleges and universities' faculty are more accepting of instructional technology, this is not the case of P-12 public school teachers. The literature highlighted that the achievement gap in the United States is widening, especially in urban schools, and could be a major external factor for teachers about their perspectives, levels of concern, and usage of instructional technology. Instructional technology has been proven in education to engage, motivate, and propel students. The literature repeatedly expressed students are engaged in instructional technology. It also revealed that instructional technology could be useful for instruction and assessment and has been proven to improve assessment scores in higher education, but research is emerging on instructional technology's success in P-12 schools.

Chapter 3: Research Method

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. In most U.S. school systems, teachers can choose to use traditional methods of instruction, or they can opt, most times, to use alternate or innovative methods (Cuban, 2013). It is important to learn from teachers the meaning or reasoning involved in choosing or avoiding certain instructional methods (Cuban, 2013). The answer is important to educational reformers and stakeholders because student academic success is the desired outcome. So, if all educational stakeholders desire academic success, then studying why proven instructional methods are not being implemented is essential.

Teachers have a varying degree of autonomy in the classroom and can choose to implement traditional or alternative methods of instruction (Cuban, 2013); and, while either path could be useful, neither should be categorically dismissed. Chapter 3 includes the research design, approach, rationale, the research questions, sampling (participants) and setting information, instrumentations, materials, data analysis, and collecting information, threats to validity, and quality for my qualitative study. Furthermore, within this chapter, the role of the researcher and a summary are provided.

Chapter 3 focuses on the methodology. This chapter pertains to the major sections: Research Design and Rationale, the Research Questions, Researcher's Role, Methodology (Participation Selection and Recruitment Logic, Instrumentation, Procedures for Recruitment, Participation, and Data Collection), and Issues of

Trustworthiness (Ethical Procedures). In this chapter, I provide explicit and concrete details about the setting, participants, the research design, data collection and analysis, and potential threats to the validity of the study.

Research Design and Rationale

Research Questions

The following research questions (RQ) were used to guide this research study:

RQ1: How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their respective classrooms?

RQ1a: What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?

RQ1b: What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?

RQ1c: How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?

Central Concepts of the Study

The generic qualitative approach was used to understand better how and why, despite access to educational technology and research data, many public-school teachers are resistant to integrating instructional technology (learning applications, SMART tools, and resources) in their respective classrooms. The literature suggested that there are

multiple factors to consider defining and comprehending a teacher's level of resistance to using instructional technology. Such resistance could be dependent upon one or more of many factors, including the teacher's beliefs, experiences, level of knowledge, attitude, confidence, and usage in the classroom, training, institutional priorities, and administrative and monetary support (Hall & Hord, 2015; Kalonde & Mousa, 2016). Many public school teachers seem to resist teaching their students using instructional technology because they have limited knowledge or practice adapting or transforming instruction to include instructional media or technology to engage their students (Cuban, 2013; Hill & Guzdial, 2017; Siemens et al., 2013). Kurilovas (2020) altered the discussion by stating that teachers have the power to choose what to incorporate instructionally in the classroom. Despite teachers having the power to choose whether to adopt or implement educational instructional technology, they were reluctant to adopt educational instructional technology in the classroom.

I used CBAM and two of its components, SoCQ and LoU, for criterion-based sampling, data collection, interviews, analysis, and interpretation. First, SoCQ was used for criterion-based sampling, and then LoU was used for data collection, interviews, analysis, and interpretation. CHAT served as a theoretical lens to assist with identifying, analyzing, describing, and understanding the relationships between the teacher, sociocultural factors, and the activity system as well as what teachers perceive influences how they choose to act toward implementing instructional technology for student learning.

I used the CBAM SoCQ (Appendix A) to select teacher participants from the overall teacher population of District X and help establish early coding categories. The survey data was used as a criterion to determine the sample from the general population. Then, I interviewed teacher participants from the sample using the LoU Interview Protocol to explore further the relationship between each teacher's level(s) of concern and usage of instructional technology regarding the implementation of instructional technology for instructional purposes. The interview responses were used to understand better how teachers' concerns and levels of usage affect the implementation of instructional technology.

Generic Qualitative Design

A qualitative approach employing a generic research design allowed me to explore and understand the sociocultural and historical factors, experiences, perceptions, and influences that public school teachers have on integrating instructional technology in the classroom. The generic qualitative research approach outlined by Kennedy (2016) is not guided by an established set of theoretical assumptions like other qualitative methodologies (e.g., ethnography, phenomenology, or case study). The generic qualitative approach is not aligned with and does not claim any specific methodological process (Percy et al., 2015); instead, the generic qualitative approach builds on the strengths of those traditional established methods and allows for flexibility, which makes it a desirable research approach. In other words, the generic research approach allows the researcher to use and potentially blend the strengths of the other traditional methods without claiming or aligning any of them. The advantage of such flexibility is that it

serves as a solution for the researcher whose study is not cleanly aligned to any established qualitative methodology.

Kahlke (2014) concluded that there are two types of generic qualitative research: an *interpretive description*, which relies on crafting research questions from experiences and collecting theoretically rigorous evidence that can be used in the physical setting of the study; and *descriptive qualitative* research that involves a method to yield description that is minimally implied or inferred about a phenomenon to minimize subjectivity. I chose the descriptive generic qualitative approach because it is beneficial for research, permits the researcher to explore and question new and previously studied areas of educational research, and works beyond the established qualitative research methods (see Kahlke, 2014).

Generic Study Selection Rationale

The descriptive generic qualitative approach was chosen because it is not bound by any of the traditional qualitative methods, yet it permits the researcher to blend complementary traditional or established qualitative research approaches into a hybrid qualitative methodology (Kahlke, 2014). The descriptive generic qualitative design allowed me to analyze, describe, and interpret the actions, perceptions, beliefs, and experiences of teachers when they pertain to integrating instructional technology in the classroom (see Percy et al., 2015). This approach was chosen because it allowed me to blend key characteristics of phenomenology and case study flexibly, yet not be constrained by the specific guidelines of either (see Kahlke, 2014). The generic qualitative study method allows a researcher who has less control over the cultural or

social setting or phenomena (integration of instructional technology) to complete a qualitative study that is not fixed by the guidelines of a case study or phenomenology but rather allowed for the time and means for reflection on the variables to focus on the unique practice-oriented nature of the study (Merriam & Tisdell, 2016). The descriptive generic qualitative research approach is beneficial when using CBAM and its data collection tools, because the SoCQ, used for criterion-sampling, helps the researcher to describe and illustrate how the survey data would help me to select the correct or best participants. At the same time, the LoU Interview Protocol aided in illustrating how a teacher's behaviors and sociocultural and historical factors may influence his or her desire to adopt technology based on use in the classroom.

Other Traditional Qualitative Research Approaches and Methods Considered

There are multiple methods associated with qualitative research. These include, but are not limited to, ethnography, phenomenology, and case study. These three qualitative research methods are similar, based on how data is collected but differ in the purpose or reason for the qualitative research being conducted. Of the three, which were initially considered for this study, key elements were retained to enhance the data collection and analysis associated with the generic qualitative design being used.

Ethnography. The ethnographic study was considered the earliest and most familiar version of qualitative inquiry and is centralized to the study of a culture of a people, race, or ethnic group (Merriam & Tisdell, 2016; Patton, 2015). Culture is then defined as relating to the patterns attributed to a given group of people's actions, behaviors, language, and beliefs over time (Creswell & Creswell, 2017; Merriam &

Tisdell, 2016). I considered this method for the current study because it aids the researcher explore and learn about different cultures and human behaviors. The method was also appealing because the data tend to be very detailed and in-depth. An ethnography was not chosen for this study because it tends to be time consuming, labor-intensive, and requires that the researcher is extremely experienced to diminish researcher bias about research design, data collection, and analysis (see Merriam & Tisdell, 2016). Also, the ethnographic design was not chosen, because while this study pertains to a specific group and its culture, the study was primarily focused on the influence of teachers' attitudes, concerns, behaviors, and perspectives on the implementation of education technology. Still, as the research questions suggested, maintaining an ethnological understanding of the culture and historical influences of the setting for the study was important to collecting and interpreting data for the study.

Case Study. Qualitative case study research could be used to explore and better understand the significance of how and why public-school teachers' perspectives influence the integration of instructional technology. The case study approach was considered because it would have allowed me to seek and explore using multiple means to understand better a specific case or phenomenon (see Creswell & Poth, 2016; Yin, 2014). Additionally, this research tradition was considered because the case study encompasses collecting data, acquiring knowledge, and focusing attention on comprehending the cultural, historical, or social setting involved, instead of simply predicting and controlling the setting (see Creswell & Poth, 2016; Patton, 2015). The case study method has many benefits. For example, it is inexpensive, uses interviews

primarily, and can be accomplished remotely. Still, this methodology was not selected because it is an approach that can be time consuming and labor-intensive for data collection and analysis (see Merriam & Tisdell, 2016; Yin, 2014). Instead, I borrowed some attributes from the case study approach: the unit of analysis, bounding, and context (see Merriam & Tisdell, 2016; Yin, 2014).

Phenomenology. A phenomenological qualitative study involves the researcher describing an activity, event, or phenomenon based on the descriptions provided by the participants (Creswell & Creswell, 2017). According to Merriam and Tisdell (2016), this research method is used to study how an individual derives or perceives meaning from an event and is suggested to be most appropriate when a researcher needs to study or thoroughly describe an emotional or intense human event or experience. I considered this method because there is a great potential for the researcher to be exposed to and then better understand unique participant perspectives, detailed comprehension of a single phenomenon, and rich data. This method was not chosen because the limitations exceeded the benefits. Creswell and Creswell (2017) suggested that a phenomenology, like a case study, maybe too time consuming or daunting; rely heavily on researcher interpretation, and the participants would need to impartially articulate their thoughts, feeling, and perspectives about the implementation of instructional technology. This may have been too challenging due to a teacher's level of cognition, instructional capacity, personal biases, and fears. As the study's purpose and research questions suggested, it is important to borrow from phenomenology to explore how the teacher participants' lived experiences influence the integration of instructional technology via interviews and

phenomenological interview etiquette (see Merriam & Tisdell, 2016).

Researcher's Role

As the researcher, my job was to review literature, conduct research, observe the participants in their environments, interview the participants using the CBAM, create and use a reflective journal, analyze the collected data, and generate findings related to addressing the study problem and purpose as presented through the research questions. Qualitative research is a method of exploration allowing both the researcher and the participants to reflect, become more self-aware, and comprehend what is transpiring (Cunliffe, 2016). As the researcher, data collector, and analyzer who used a generic qualitative approach, I conducted this study from a reflexive viewpoint (see Gabriel, 2015). A reflexive viewpoint involved me considering my personal experience as a teacher in District X for over 16 years and acknowledging how those experiences may influence both the process and outcome of this generic qualitative study. According to Cunliffe (2016), a reflexive approach would assist me in reflecting on my thoughts, in congruence with analyzing the process and the teacher participants' interview data objectively and intentionally. A reflexive approach aided in increasing the effectiveness of my role as the researcher regarding comprehending the whole experience, the data collection process, and the process of interpreting and analyzing the collected data (see Cunliffe, 2016). Cunliffe (2016) proposed that the reflexive approach would shift my personal and professional biases from being a negative into a required feature of the generic qualitative approach, so I applied the reflexive approach using a reflective journal throughout the study.

As a teacher within District X, there was a possibility that I may have been acquainted personally and professionally with some participants from the past, currently, or in the future, so I kept a research journal to log descriptions of personal reactions and insights about the past or self and interactions with participants. Although I am an insider in the school system, I was not a participant. If I was acquainted with a participant, I removed the person as a potential participant (see Yin, 2014).

As the researcher, I had to request permission in the form of a formal cover letter (Appendix C) to complete the study in District X. Once permission was granted from the school district, I contacted several school principals for permission to initiate contact with their teachers and began the procedures leading to data collection. The principals or school administrators were the ones to discuss this opportunity with potential teacher participants initially. The hope was that contact with multiple educational sites would increase the participant population and, ultimately, the sampling size.

Methodology

Participant Selection and Recruitment Logic

Population

The general population for this study included all the P-12 public school teachers from District X. These teachers represent diverse backgrounds, ages, gender, levels of education, sexual orientation, and content areas. Cuban (2013) pointed out that most American teachers use technology as a tool or digital resource for themselves (planning and communicating), but not enough teachers use technology for student-centered instruction. The rationale for having a teacher population of over 4,000 for grades P-12 is

to accumulate a strong full faculty representation to increase the odds of having a sizable enough target population to select from for the purposive sample. The goal was to have a population large and varied enough to maximize the collection of rich, thick, and descriptive data (Merriam & Tisdell, 2016). To identify and recruit teacher participants for this study, I completed the research request submission process required by the District X school system to gain access to the population.

Sampling Strategy

From the targeted teacher population from School District X, the goal was to establish a sampling frame from which a minimum purposeful sample of eight to 12 teacher participants can be drawn. According to Patton (2015), it is appropriate to provide a minimum sample size "based on expected reasonable coverage of the phenomenon given the purpose of the study" (p. 314). Like a case study using two-tier sampling, this study's sample selection occurred in two phases. First, all teachers who agreed to participate received the CBAM SoCQ to complete, creating the sampling frame. The seven Stages of Concern are Stage 0, Unconcerned, Stage 1, Information, Stage 2, Personal, Stage 3, Management, Stage 4, Consequence, Stage 5, Collaboration, and Stage 6, Refocusing (Hall et al., 1979). The data was interpreted using the web-based version of the Quick Scoring Device (Appendix D) to create a score profile for each participant. A teacher participant needed to score minimally at Stage 1 to be interviewed using the LoU Interview Protocol (criterion-based purposive sampling). At Stage 1, a person at least shows concern, general knowledge, awareness, and concern for the innovation (George et al., 2006). Secondly, teachers were selected from the sampling frame using the CBAM

SoCQ score (scores range from 0 to 6) on their respective questionnaire: A score of Stage 1 (participant shows concern) or higher was used to select the purposive sample participants (see George & Rutherford, 1979). If a teacher scored at least at Stage 1, the teacher demonstrated that they are concerned.

To access teacher participants, I first contacted the office of the chief of staff for School District X to submit my proposal for review and approval. Upon local approval of my research proposal, I sent the participant cover letter (Appendix C), and consent form to school and educational campus principals. As teachers agreed to participate in the study, each participant was provided the consent form and the CBAM Stages of Concern Questionnaire to complete and submit. The SoCQ was used to ascertain the level or stage of concerns that teachers have regarding the integration of instructional technology.

Instrumentation

This qualitative study used one diagnostic tool for data collection, CBAM's LoU Interview Protocol. In Figure 2, the uses of CBAM and CHAT are shown pertaining to sampling, data collection, and data analysis. CBAM is a research-based conceptual framework that provides three diagnostic tools and strategies to aid a researcher in understanding and then providing recommendations for professional development (AIR, 2017). The tools were created as a part of CBAM in the 1970s and 1980s by a research team of the Research and Development Center for Teacher Education at the University of Texas, Austin, and they were updated in 2006 to enhance their reliability and validity (AIR, 2017).

CBAM Levels of Use (LoU) Protocol

The LoU tool is an interview protocol that allows the researcher to better understand to what extent teachers are using instructional technology in their classrooms based on the different approaches to using innovation and documenting the extent of implementation (Hall et al., 2006, p. 5). The LoU allows researchers to define the phenomenon concerning participants' behaviors, and to focus on what participants are doing or not and how they are or are not using instructional technology (Hall et al., 2006). The developers of LoU worked to ensure affordability, reliability, and validity by making it a qualitative data collection instrument that involves the use of focused interviews that include using Decision Points for categorizing the levels of use and a branching technique based on participant interview responses (Hall et al., 2006). Before the interview, three to five requirements must be met to determine if the teacher participant is a user or non-user. If the participant is a non-user, the participant would be administered a Focus Interview only (Hall et al., 2006). If the participant is a user, the teacher participant was administered both the Branching and Focus Interviews (Hall et al., 2006). First, this tool requires interviews using a branching strategy; then, the protocol instructs the interviewer to complete a focused interview using probing questions (AIR, 2017). Once the interview was finished, a rating sheet was completed for the teacher participant. I used the LoU Basic Interview Protocol (Appendix B) and then the LoU Rating Sheet (Appendix E) as part of the data analysis (see Figure 2). The LoU manual states that certification training is required to use this data collection and

diagnostic tool to increase the reliability and validity of the study. I receive certification training in 2021.

Procedures for Recruitment, Participation, and Data Collection

Principals of District X were contacted for permission to recruit their teachers for this study. If a principal granted permission to reach out to the school's teachers or a list of teachers was provided, I emailed the recruitment letter. Teachers that volunteered received the link to complete the online version of SoCQ and had up to two weeks to complete the SoCQ. The Quick Scoring Device (Appendix D) was used to create a score profile for each teacher. A teacher needed to score at Stage 1, the Information stage, or higher to be interviewed using the LoU Interview Protocol for criterion-based purposive sampling (see Figure 2).

The LoU interview notes and rating sheet were used to compile and record data. Participants exited the study with a debriefing meeting of 10-15 minutes that immediately followed the LoU interviews either in person at the teacher participant's school or via Skype or a similar online application. During the debriefing meeting, I provided the participant with my contact information just in case the participant had questions or concerns, and we reviewed the purpose of the study, confidentiality, and if the participant wanted to receive a copy of the final report.

As the study researcher, I was the data collector. Because 15 teachers of District X completed the SoCQ toward consideration for inclusion in the criterion-based sample, there was no need to use additional sampling strategies or repeat recruitment efforts.

Data Analysis Plan

This descriptive generic qualitative design was flexible yet rigorous enough for me to analyze, describe, and interpret the data collected. I collected the interview data, analyzed, and interpreted it. The data analysis process involved analyzing the collected data to code raw data, create categories, identify patterns and themes, and log similarities and differences to better understand the data contextually using CBAM and CHAT.

CBAM, the conceptual framework, was the basis for data collection; CBAM and CHAT were used for data analysis. CBAM's LoU Interview Protocol data was analyzed and interpreted to respond to the research questions. Also, I used the Basic Interview Protocol to conduct first the branching and then the focus interviews "using the branching format, the required basic questions, and the appropriate probes" (Hall, 2010, p. 22) and the LoU Rating Sheet to rate all the Categories and provide an overall rating for each interview as prescribed by the LoU Manual. The interviews were transcribed into a Microsoft Word document and were read and reviewed numerous times before the initiation of data analysis (see Creswell & Creswell, 2017; Patton, 2015). Next, I used literature-based codes suggested by the research presented in Chapter 2 that stem from CBAM's LoU (Appendix B) and CHAT to craft the initial codes (Appendix F) to help develop categories and identify themes in the data. Potential literature-based codes suggested by CBAM include use(s), collaborate, seek(s), prepare, decide, and organize. Potentially, initial categories are knowledge, acquiring information, sharing, assessing, planning, status reporting, and performing (Hall et al., 2006). Potential literature-based codes suggested by CHAT are subject, tools, object, community, subject-object, subject-

tool, and subject-rules (Trust, 2017). The initial codes and categories were used to craft a codebook that included code descriptions and examples.

After the LoU interview transcripts were coded, I additionally analyzed the data to ensure that the categories were accurate. After coding the data, I explored the relationships between codes and LoU data to respond to the research questions; NVIVO 12 was used to complete content and thematic analyses. The categories and the LoU Rating sheets were studied to find meaning based on divergent teacher perspectives (phenomenological analysis), identify sociocultural relationships and patterns (ethnographic analysis), and then complete a cross-case analysis that involves comparing the data of the teacher participants to respond to the research questions (case study analysis). There were two discrepant cases (e.g., data associated with teachers acting in isolation conflicted with data associated with teachers sharing information), so their associated codes and categories were modified or revised during the data collection and analysis process (see Merriam & Tisdell, 2016). The discrepancies are discussed in detail in Chapter 4. Outlining the data procedures participation, recruitment, data collection and the data analysis process was essential to addressing the potential issues of trustworthiness described in the next section.

Issues of Trustworthiness

The validity, as it pertains to qualitative inquiry, deals more with the wealth and depth of the details and description of the case and the analytical and observational aptitude of the researcher than a factor like sample size (Patton, 2015). Internal validity requires several factors to be addressed and considered. One factor that pertains to

validity is instrument construction and selection of tools. Patton (2015) concluded that it is key to make sure that the constructed instruments measure accurately. With participant consent, I used my laptop to collect data and initially store data, record (audio and video) interviews, and compose the final case study narrative using NVIVO 12. All data was then stored on an external hard drive that was not connected to the Internet.

Another factor considered was the researcher as an instrument. The skillset, competency, and internal and external stressors of the researcher can adversely or positively affect data collection and analysis (Patton, 2015). According to Hall et al. (2006), the researcher needed to be trained and certified to use the LoU Interview Protocol and accompanying resources. Another factor that was considered was objectivity. To ensure objectivity or trustworthiness, the participants volunteered, and there were no designated or preselected school sites or teachers.

Member checking, reviews by the dissertation committee, and the Walden University Institutional Review Board and methods triangulation were used to ensure credibility and validity. Theoretical analysis was compiled using CHAT. In terms of credibility, dependability, transferability, and confirmability, a qualitative data audit was conducted along with member checking, which entailed the teacher participants reviewing their responses to the SoCQ as well as their responses to the LoU Interview Protocol. Member checking, as recommended by Creswell and Creswell (2017), is beneficial because it provides the researcher with a way to comprehend and better indicate what the teacher participants meant in their responses. Member checking provided the teacher participants with the chance to confirm, fix errors, and raise

concerns about interpretations of their responses, and it provided the researcher a chance to summarize study findings. The member check form for participants is Appendix G. Also, a data saturation grid (see Appendix L) was used and completed to determine when an ample sampling had been compiled for credibility. Participants also were debriefed using a one-page summary of the findings via Microsoft Teams.

Transferability or external validity involved sampling to vary participant selection and thick description. As stated above, this study involved criterion-based purposive sampling, and a data saturation grid (see Appendix L) was used to determine data saturation. Creswell and Creswell (2017) pointed out that a thick description includes a rich description or detailed accounting of each teacher participants' feedback or comments (if offered) as well as their LoU interview responses. The thick description should provide meaning and cultural and social contexts in answering the four research questions.

Regarding dependability, an audit trail or log was kept and stored securely that tracked data collection and analysis (Creswell & Poth, 2016; Merriam & Tisdell, 2016; Yin, 2014). Triangulation was used to analyze the data from the various participants to justify the identified themes and patterns. Creswell and Poth (2016) suggested that when themes and patterns are derived from a merging of data from multiple sources or participants, the process provides validity to the qualitative study.

This study's confirmability derived from using the CBAM diagnostic tools and related resources that have been used in many qualitative studies (Hall et al., 2006). Also, reflexivity was acknowledged and addressed. Creswell and Poth (2016) recommended

that knowing my role and understanding how my biases and level of research experience could influence this study and its findings. My role and interactions with participants and the data had to be clear and as objective as possible, which is why an audit log (see Appendix K) was kept.

Ethical Procedures

For this qualitative study, I adhered to many ethical considerations. Each teacher participant received a cover letter, a main study consent form, and a confidentiality agreement. The teacher participants were treated humanely and with respect throughout the case study based on the ethics and compliance guidelines of Walden University. The recruitment process was fair and equitable, and participation in the study was voluntary. No one at Walden University or any representative of District X public schools treated any participants differently if a teacher decided not to be in the study. If a teacher participant decided to be in the study initially, the participant could still change their mind later, as documented in the study consent form.

Before the study began, consent from District X was needed to work with their teachers. The process for consent, outlined by District X, included providing a cover sheet and a narrative description from the researcher; evidence of sponsorship and a statement of support were needed from a central office representative or school administrator. Sponsorship came from a" School Principal, evidence of IRB approval and any IRB-approved forms, including consent forms; and if applicable, a copy of any letter to be sent to principals or teachers near-final copy of all instruments (e.g., interview and

observation protocols, surveys, assessments), and a brief biographical sketch of the researcher. Once consent was received, then recruitment began.

Recruitment involved sending invitations to District X school principals, receiving a list, or access to email teachers to invite them to participate voluntarily. The criterion identified earlier in the chapter was used to derive a sample. Once the teachers and submitted consent via email, the teachers that offered consent received the SoCQ to complete electronically. The sample was derived from SoCQ responses, SoCQ Quick Scoring Device and the teacher participants included in the sample complete the LoU interviews virtually. Data was collected from each and analyzed using the LoU Rating Sheet, and the Data Saturation grid (see Appendix L) was completed using Microsoft Excel®. After the initial data analysis, member checking occurred.

The LoU interview data collected was secured on an external hard drive. All documents, recordings, and compiled data associated with the teacher participants was stored confidentially, and the participants' identities were confidential. Data was kept secure by omitting participants' names from the data, using code names or numbers, and storing all data on an external private server. Reports that were derived from this study did not share the identities of individual participants. Details that might identify participants, such as the location of the study, also were not shared. The researcher did not use a participant's personal information for any purpose outside of this research study. No one had access to the data other than me, and the data collected is being stored for 5 years and then destroyed by deleting all the associated files and then erasing the external hard drive. Regarding other ethical considerations that may have arisen, the

study did not include teachers at my school and teachers with a personal relationship. There were no incentives offered or power differentials. If a conflict of interest arose, it was addressed based on the ethics and compliance guidelines of Walden University.

Being in this type of study involved some risk of minor discomforts that could be encountered in daily life, such as fatigue or minor stress. Being in this study would not pose a risk to a participant's safety or wellbeing. There was no payment offered for participating in this study. Being in this type of study may not serve as a direct benefit, but participation could benefit the children of District X.

Summary

This qualitative study was appropriate. The researcher recruited voluntary participants from District X. With consent, the participants provided related documentation and were interviewed to discover, describe, and analyze the collected data to identify patterns and themes, code, and create categories using Microsoft Excel® for data management. The analyzed data was used to respond to the research questions, to reflect and write a study narration, and to create a theoretically based model potentially. There were a series of checks and balances throughout the research process that included member checking, potential secondary reliability checks of interviews, reviews by my dissertation committee, the university's institutional review board, the District X School System's institutional research review board, and a data audit. The validity, credibility, and trustworthiness of the data were discussed.

Chapter 4: Results

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. In most U.S. school systems, teachers can choose to use traditional methods of instruction, or they can opt, most times, to use alternate or innovative methods, which typically rely upon the use of contemporary technology (Cuban, 2013). It is important to learn from teachers the meaning or reasoning involved in choosing or avoiding certain instructional methods. Understanding better the how and why many teachers are reluctant to integrate educational instructional technology is important for educational reform and to better comprehend why proven instructional methods are not being implemented is essential.

The following research questions (RQ) were used to guide this research study:

RQ1: How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their respective classrooms?

RQ1a: What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?

RQ1b: What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?

RQ1c: How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?

The current chapter discusses the setting for the study, demographics of the participants, the data collection process, and data analysis procedures associated with this qualitative study. In addition, the chapter includes evidence of its trustworthiness as a scholarly and useful educational resource, specifically relating to the credibility, transferability, dependability, and confirmability of the study. Chapter 4 concludes with a summary of my interpretive responses to the research questions along with a transition into Chapter 5.

Setting

The setting, or environment, for this study, schools within District X, is significant because teachers within the district work with a large population of impoverished, low academically performing students; limited instructional technology; and districtwide financial, technological, school resource, and staffing deficits. District X is a large, urban school district in the Eastern United States with a predominately African American and Hispanic student population. According to data provided by District X and the Walton Foundation for 2017(the most recent data available), the school district is comprised of over 49,000 students, over 115 schools, and over 4,000 teachers.

Following what was believed to be the peak of the worldwide panic associated with the Covid-19 pandemic, in January 2021, the teachers at the school district, including me, were required to return to in-person or hybrid instruction as part of a regional research effort to learn how to best get students back into their education. Amid

safety concerns and reports of schoolwide COVID outbreaks, most principals were hesitant to agree to allow their schools to participate in the research study or to forward the research study invitation to staff because many teachers seemed wary to return to in-person instruction. As the administrative consensus began to tip toward online instead of face-to-face instruction, teachers, many of whom had never relied upon instructional technology in the past, suddenly were required to teach their classes virtually using multiple computer applications and digital platforms. In addition, many teachers were also dealing with teaching from home with their own children and other family members present. For teachers who were also parents, teaching from home was additionally challenging because they had to assist their children with completing schoolwork as well as instruct their classes. Finally, teaching online concerned many educators, because others in the home may have been front line workers during the pandemic and may have been at a higher risk of contracting and bringing home Covid-19.

The hectic nature of the pandemic influenced setting also affected my experiences as the qualitative researcher. District X granted permission for the study in December 2020. First, requests to solicit potential participants were sent to several district principals across the city. After the initial requests were emailed out, due to Covid-19 concerns, no principals granted me permission to consider their teachers for the study. Then, the decision was relayed from District X's central office that teachers would be required to return to in-person instruction or begin using a hybrid teaching model in January 2021. The third week of January 2021, I emailed out requests to the P-12 principals citywide to

solicit potential participants. This time, I received permission to recruit teachers from five schools by March 2021.

The determination of an acceptable memorandum of understanding (MOU) between parties (District X and Walden University) became lengthy and contentious as district administrators who were part of the MOU negotiating process became more concerned about the pandemic and harder to locate as they, too, were being personally cautious. Because it took the two negotiating parties almost 5 months to determine, approve, and sign an acceptable MOU, the final approval, expected in January or February, was not received until May 18, 2021, I received Walden IRB permission (11-25-20-0308291) to begin my study. This unexpected delay made access to the target population difficult with the end of an already trying school year coming in June 2021.

The environmental changes greatly influenced not only the instructional experiences of district teachers, who might become participants in the study, but also access to that target population became substantially restrictive. With the late start to recruiting added to the lingering Covid-19 worries, many teachers were less inclined to participate. With final grades due, end-of-year instructional deadlines looming, anticipation of vacations for the summer, and the May announcement of the return to in-person instruction for students and teachers for the upcoming school year, the timing of data collection for the study represented a large challenge to participant recruitment.

Despite the challenges, I was able to recruit six participants before the school year ended. When summer school classes began, I renewed recruitment efforts. Immediately there was a new challenge as summer schoolteachers resumed in-person instruction for

the first time since March 13, 2020. As a result, safety concerns pertaining to having enough personal protective equipment (PPE), water, and space for social distancing arose. Many teachers were worried because of the nondisclosure policy for the district; that is, administrators could not disclose who tested positive for Covid-19 and people who discovered that they had tested positive on their own did not have to disclose their status. Combined, these factors made recruitment difficult. Additionally, some teachers who had agreed to participate failed to complete communications in a timely manner or did not do so at all.

With the start of the 2021-2022 school year, recruitment remained challenging because teachers did not report back to work until August 20, 2021. Teachers were not responding to recruitment emails nor follow-up emails for teachers who may have agreed to participate in the study. When teachers returned for the school year, many were overwhelmed by a lack of technology, instructional resources, PPE, staffing concerns (vacancies and too few substitute teachers), all students returning to in-person, and remaining COVID -19 free.

Despite all the challenges outlined, I was still able to collect a proper sample. The sample is weaker than previously anticipated before the pandemic or more normal times. The sample of 10 participants met the recruitment criteria, and the sample was a sufficient size for a study during an ongoing pandemic.

Demographics

The 10 participants of the study were all public-school teachers from District X. Nine participants are either secondary mathematics, exploratory (dance and physical

education), special education, or English language arts teachers. One participant is an elementary teacher. Most participants have taught at their respective schools for over 5 years and have been educators for over 15 years. One teacher is a novice, who had taught for a year, using an online venue. All the participants except one are African American and three of the 10 participants identify as male. All the participants commonly use educational instructional technology, but one teacher is a past user due to a promotion to dean of students early in the 2020-2021 school year.

Data Collection

Initially, 17 teachers agreed to participate in the study, and each received the CBAM SoCQ to complete. Fifteen of the teachers who agreed to participate completed the CBAM SoCQ. Of the 15 teachers who completed the CBAM SoCQ, only 10 qualified to be sample participants, because they received a score greater than zero, which was the requirement. Six of the 10 sample participants qualified for the LoU interviews in June 2021. One additional potential participant was recruited and qualified to be a sample participant in July 2021. Six teachers completed the SoCQ in August 2021, but only one qualified to be a participant and in September 2021 there were two potential sample participants who completed the SoCQ and qualified to participate in the LoU interview sessions. In summary, five of the 15 teachers who volunteered to participate scored 0 on the SoCQ resulting in a working sample of 10 participants to be interviewed.

The 10 participants were interviewed using the LoU Interview Protocol (Appendix B). Prior to the interviews, each participant was reminded of the voluntary nature of the study and that they could withdraw at any time. Also, the participants were

informed that the virtual interview was to be audio recorded and auto transcribed using Microsoft Word. Auto-transcription is a feature of Microsoft Teams. As the interviews progressed, the application provided the transcription in real time based on what was stated by the interviewer and interviewees. I then downloaded and reviewed the transcription for each participant. The review process involved playing back the audio and then making corrections as needed. Next, the participants received a copy of the corrected transcript for a member check and to use to offer any clarifications or corrections on their respective interview responses. Data collection occurred from May to September 2021 with participants completing the SoCQ and, for those who scored adequately, the LoU interview over a 2-week period. LoU interviews involve several components, such as requiring all interviews to be audio recorded, rating all categories, and providing an overall score for each participant using the Decision Points on the LoU Rating Sheet (see Hall et al., 2006). I also had to adhere to the criteria for determining the usage/non-usage decision (see Hall et al., 2006). The highly structured interviews averaged between 11-30 minutes in length as audio recorded, timed, and transcribed using Microsoft Teams. I took notes on a LoU Rating Sheet as I interviewed each participant. Data collection did not entail any variations from the plan outlined in Chapter 3 and there were no unusual occurrences during data collection.

The participants' responses were derived from the LoU Interview Protocol branching and focusing questions that comprise the CBAM Branching Chart (Figure 4). The branching questions were crafted to collect, in a timely fashion, the maximum amount of descriptive data on each participant's use of educational instructional

technology. The questions are mostly closed (yes or no) questions to determine the appropriate focus or follow-up questions to ascertain that participant's levels of use. In practice, then, the first branching question is "Are you using the innovation?" and the participant answered "Yes" or "No." The next question or questions were based on that initial response. Thus, as the interview progresses, the branching questions are used as categorical decision points (per the Rating Sheet) to pinpoint the level of use. In addition, because of the structure of the LoU interview, participants would not have responded or been asked every question.

To determine the appropriate level of use, I asked more focal questions with the last two questions used to collect any data that may have been omitted. The LoU Chart (see Appendix B) outlines the categories used to determine the usage level rating along with the scale and decision points per level. All data (audio recordings, LoU Rating Charts, and transcriptions) were studied for each individual participant and then a level of use was assigned using the LoU Innovation Chart (see Appendix B), researcher notes, and the LoU Rating Sheet (see Appendix E) as prescribed by the LoU Manual (see Hall, 2010, p. 22).

Data collection occurred from May to August 2021. Data collection for the LoU interviews included audio transcriptions, my reflective journal entries, and my researcher notes related to interview responses, Participants' #1-10 LoU Rating Sheets (see Appendix J), and coding for common responses. Then the transcribed interview data for each participant was read multiple times, edited, and revised as needed for accuracy

while listening to the audio recording before the initiation of data analysis (see Creswell & Creswell, 2017; Patton, 2015).

Figure 4

CBAM Branching Chart

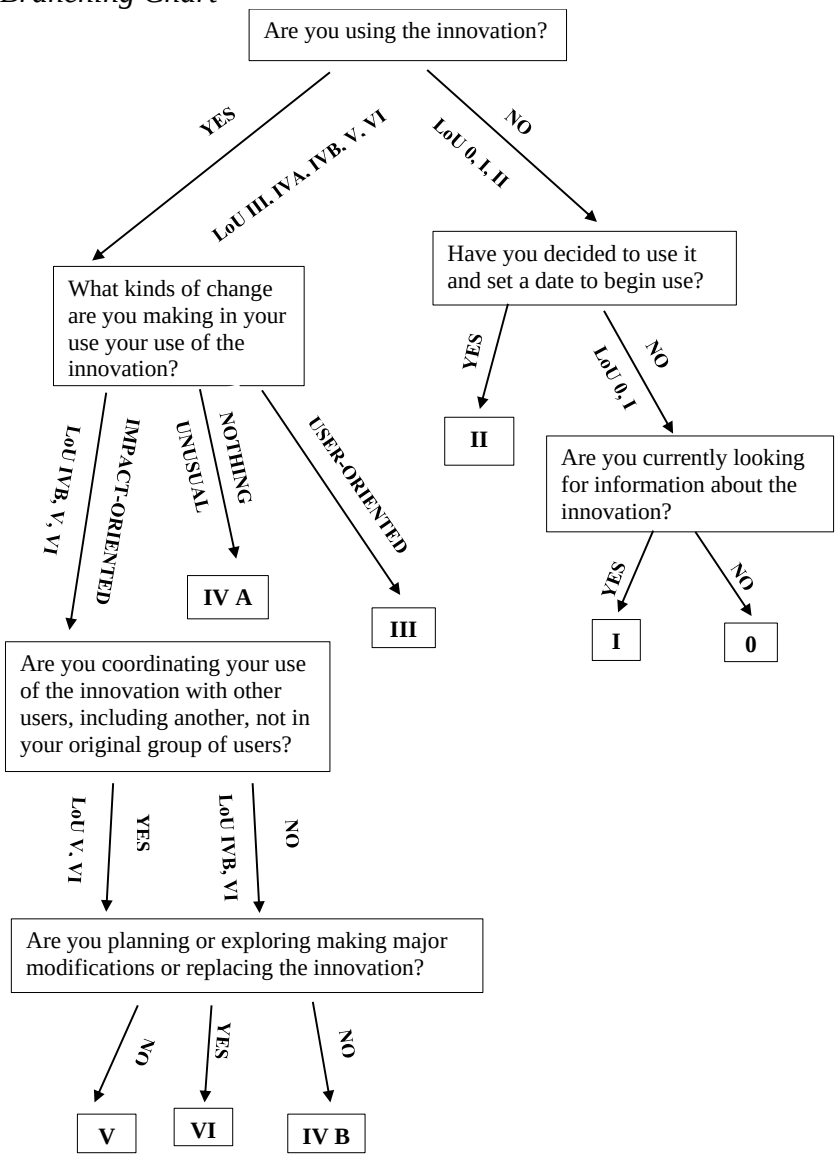


Table 1 shows the participant number (#), level of use of the innovation (LoU), the type of user based on level of use (LoU Category), and description of the category for the ten teacher participants who were interviewed (LoU Description). The levels of use of

educational instructional technology are based on the frequency of usage within a range of time, and the behaviors of the teachers in their use of the innovation based on familiarity, skill, and adaptation. The LoU Interview Protocol questions and usage categories or indicators (knowledge, acquiring information, sharing, assessing, planning, status reporting, and performing) were used to determine the types of users the teacher participants were or the patterns that distinguished each participant's levels of use. If a participant is at LoU 0, they are a nonuser or a past user who has not used the innovation in the past 12 months; there is one such user, Participant #4. Participants #7, #8, and #10 are LoU III or Mechanical users. These three participants have implemented educational instructional technology in their classrooms, but focus on its daily adoption, not on reflection of their use or how they could improve implementation for their students' academic success. Participant #9 is at LoU IVA, a Routine user. This participant is a more stabilized user of the innovation than the three at the Mechanical level, yet this participant reflects very little on the process of implementation. Participants #1, #3, and #5 are at LoU IV B or Refined users, who reflect and pay more attention to implementing educational instructional technology by making minor changes to potentially improve implementation for students' academic success. Participant #2 is at LoU V, an Integrator, who collaborates with at least one other teacher pertaining to the implementation of educational instructional technology. This type of user also makes changes to the implementation of educational instructional technology to improve academic progress for students. Participant #6 is at LoU VI, Renewal. This user has reflected on implementation and makes major changes or replacements to the implementation of educational

instructional technology with the students' academic needs as the priority. The LoU and types of users were derived from the data collected using the LoU Interview Rating Chart as I was certified and trained to apply it (see Appendix I).

The CBAM analysis enabled me to understand the impact of each teacher's behaviors, level, and type of use of educational instructional technology on the adoption or integration of the innovation in their classrooms. This information is useful because it provides many answers to the research questions; for example, in Table 1, Participant #7 is a Mechanical user and that means that the participant focuses on short-term, day to day use of educational instructional technology with little time for reflection, only makes changes to meet the needs of the current students and attempts to master the tasks required to use educational instructional technology. Also, knowing the type of user and level of use provides a description of how the teacher behaves and interacts with the innovation, and in this case, Participant #7 uses it in a disorganized and superficial manner.

Data Analysis

Table 1

Participant Levels and Types of Use

Participant #	Level of Use / Category of User	LoU Description
1	IVB Refinement	State in which the user varies the use of the innovation to increase the impact on students within his/her immediate sphere of influence. Variations are based on knowledge of both short-and long-term consequences for students.
2	V Integration	State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their sphere of influence.
3	IVB Refinement	State in which the user varies the use of the innovation to increase the impact on students within his/her immediate sphere of influence. Variations are based on knowledge of both short-and long-term consequences for students.
4	0 Non-Use	State in which the user is not involved with the innovation for over a school year.
5	IVB Refinement	State in which the user varies the use of the innovation to increase the impact on students within his/her immediate sphere of influence. Variations are based on knowledge of both short-and long-term consequences for students.
6	VI Renewal	State in which the user reevaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field and explores new goals for self and the system.
7	III Mechanical	State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.
8	III Mechanical	State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.
9	IVA Routine	Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation of thought is being given to improving innovation use or its consequences.
10	III Mechanical	State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.

After the deductive application of CBAM data analysis, an inductive analysis was used to discover the trends, patterns, and categories derived from the interview transcripts, or verbiage provided by the 10 participants. During this inductive data

analysis, the process to discover the trends, patterns, and categories involved three steps: (a) analyzing words and phrases (word repetition, word repetition in context, and educational jargon); (b) re-reading and scanning the data multiple times in search for missing information (assumptions), comparing the data; and (c), studying the linguistic connectors and transitions. Next, the data were examined for similarities and differences in participants' interview responses and diction. The data were examined to interpret the stimuli, the sequence, and frequency of participants' actions and interactions, specifically usage, reflection, and change making of the innovation individually and collaboratively to select categories and determine patterns and trends. Category development included a convergent and divergent analysis of the participants' responses. Initial categories that were determined from this process included instruction, resources, training, usage, sharing, acquiring information, planning, assessing, challenges, practice, changes, and content.

The first phase of data analysis included coding, first deductively with the initial codes (Table 2) and then with the auto codes derived using NVIVO 12 (Table 3). Both Table 2 and Table 3 are organized and structured by frequency count. I determined literature-based (initial) codes from the content of the research discussions presented in the Literature Review Related to Key Concepts and Variables section of Chapter 2. Other initial codes were determined based on the Decision Points from the CBAM LoU Interview Protocol and LoU Rating Sheet. The literature-based codes were used to craft a codebook that includes code descriptions and examples as shown in Table 2.

Table 2

Initial or Preliminary Coding

Initial Codes	Number of times used in transcripts
Use(s)	103
Collaborate	13
Seek(s)	0
Prepare	4
Decide	1
Organize	2
Knowledge	9
Acquiring information	0
Sharing	38
Assessing	15
Planning	31
Status Reporting	3
Performing	4
Subject	1
Tools	8
Object	2
Community	1

Those initial codes were used in NVIVO 12 software to highlight each instance in which the words were presented within the data. After analyzing the frequency of use of the initial codes, which in some cases produced very few or no references, such as "seek(s)," "prepare," and "community," I used NVIVO 12 for auto coding of the transcribed data, which became the first step in shifting analysis from deductive to inductive inquiry.

Table 3

Sampling of Automatic Coding

Codes	**Number of Times Used in Transcripts**
Participant	167
Technology	148
Just	110
Know	133
Like	139
Things	98
Really	80
Using	77
One	73
Think	120
Using	213
Students	107

All the initial and automatic codes were not used for data analysis. I had to review the data again and shift attention to identifying categories that emerged from the auto-determined terms or phrases that were closely associated with numerous codes or exemplary descriptors of the participants' experiences as rendered in their own words. Only those frequently counted terms that also represented some important aspect or characteristic of the data were selected to create, with some measure of confidence, working categories for which all data were then analyzed. During the next cycle of coding, a more in depth understanding of linguistic relationships and groups of coded data occurred after using in vivo, process, and values coding methods (see Saldaña, 2015) to determine more focused categories to identify trends in the data and patterns of meaning.

The process of recognizing patterns or trends in the data included revisiting and analyzing the branching questions (see Figure 4) used during the interviews and the participants' responses to them. In addition, the process involved reviewing and further analyzing the participants' summaries of their use of educational instructional technology to find meaning, identify sociocultural relationships, and patterns of meaning pertaining to the setting, challenges, problems, levels of knowledge, and other elements. Patterns and trends emerged through analyzing the codes, determining the categories, and repeating the data analysis processes identified above.

In Table 4 the relationships between the three types of codes (in vivo, process, and value), the final list of categories, and patterns were presented. For example, the category Schools stemmed from query codes like "school," or "whole school population"

as stated by Participant #1. Those codes were related to schools, but the context varied by participant. For instance, Participant #1 discussed school in terms of being within the building, Participant #9 referred to resources purchased by a school, Participant #6 referred to the District X school system, and Participant #7 referred to technology in schools. Combing these uses of the term “school” suggested a pattern that the schools or classrooms are the technical, virtual, or physical setting in which either the resources, or object of the study, were used for the integration or use of educational instructional technology.

Table 4

Codes, Categories, and Patterns

Part. #	Coding Methods			Categories	Patterns
	In Vivo	**Process**	**Values**		
1	•Desmos •Interactive apps •To extrapolate •Explorations •Engage •Virtual environment •Manipulative tools •Making sure •Teams •Smart Suite •Truancy •School/ •Within the school •Whole school population/entire class school building •Diverse •Platform •Problem-based Current content/ Common Core Technology standards/standards	•Use Smart Suites to communicate •Nearpod to engage •Desmos/Videos/audio recordings to manipulate, extrapolate, explore, share, and comprehend math data •Analyze student data	•Proponent •Proficient •Diversity •Strong technology leaders •Different •Effective use •Norm process	•Platforms •Virtual environment •Schools •Platform •Problem •Technology •Content Usage	•Physical, technological, and virtual setting description •Characteristics and quality of use identified •Perception of features, programs, and platforms provided •Teachers' characterization of problems and solutions with integration

Table continues…

Part. #	Coding Methods			Categories	Patterns
	In Vivo	**Process**	**Values**		
2	•Tongue twister •Tech •Look at footage •XYZ •Standards met •Improve student outcomes •Tik Tok	•Collect data •Assign assignments for Performing Arts to generalize to give them real world experiences using the apps •Self critique •Videoing	•Take away tech, teaching a little bit hard •Availability •Amazing •Resource	•Content •Usage •Students •Technology	•Perception of features, programs, and platforms provided •Standards and content area specific usage •Characteristics and quality of use identified
3	•To get across •Flip Grid, Clever, Flocabulary •You name it. •Urban •Different platforms •Technology features •Bubble Up app •Unorthodox	•Make quick changes •Plan •Assess •Adapt		•Platforms •Programs •Content •Features	•Characteristics and quality of use identified •Perception of features, programs, and platforms provided
4	•Standardized •Two-fold approach •Desmos •Infused with learning styles •Algebra tiles •Blooket •Kahoot •Modality •School year	•Use calculator feature •Concept of logical thought process •How to use it	•Used it •Advanced	•Features •Platforms •Programs •Thought	•Characteristics and quality of use identified •Perception of features, programs, and platforms provided •Thought process/partners •Standards and Content area specific usage

Table continues…

Part. #	Coding Methods			Categories	Patterns
	In Vivo	**Process**	**Values**		
	•Thought •Standardized exam/testing •21st century way				
5	•Situations •Old school •Beginning of the school year •Streamline •Educational instructional platforms •Problem •Problem solving Situation •Solution •Content	•Modeling the new tools •Brainstorm solutions	•Really important •Teacher not •Trained = not beneficial •Different solution •Good thought partners	•Platforms •Problem •Solution •Thought •Usage •Content	•Physical, technological, and virtual setting description •Characteristics and quality of use identified •Thought process/ partners •Teachers' characterization of problems and solutions with integration •Perception of features, programs, and platforms provided
6	•Digital platform/apps •Last school year •District X public schools •Feedback •Certain features/ various platforms online •Learning curve •Open PE/ Phys ed. •COVID forced to jump in	•Assess •Engage •Provide feedback •Collaborate with peers •Frame out custom plans	•Major platform •Totally sold •Recognize the benefits	•Platform •Features •Schools	•Physical, technological, and virtual setting description •Characteristics and quality of use identified •Identification of innovation used and the quality of use •Teachers' characterization of problems and solutions with integration

Table continues…

Part. #	Coding Methods			Categories	Patterns
	In Vivo	**Process**	**Values**		
7	•2021 school year •Covid-19 pandemic •Online •Microsoft Teams •Canvas •Microsoft and Google platforms •Technology in schools •One to one •A-NET •Feature •Interactive/draw •Newer/audio/ video recording features	•Access outside of school/ even in school	•Difficult •Benefits	•Platform •Features •School •Usage •Technology	•Physical, technological, and virtual setting description •Identification of innovation used and the quality of use •Perception of features, programs, and platforms provided
8	•Let me pause and think •Considered •Khan Academy •Project •Funding knowledge •Functionality •Platform(s) •Technology use •Thought •Student performance	•Use for summative and formative assessments. •Use to introduce	•Primarily use because its accessible. •I need to know how it is benefitting my students.	•Platforms •Technology •Thought •Students •Usage	•Identification of innovation used and the quality of use •Perceptions of innovation •Description of stakeholders •Thought process/ partners *Table continues*

Part. #	Coding Methods			Categories	Patterns
	In Vivo	**Process**	**Values**		
9	•Interactive stuff/ just different stuff/kids •Tech savvy •Resources school may purchase •Science content •School issued computer •University's project •Extremely expensive •Platform	•Use it to get kids engaged	•Heavy lift •Unwilling •Biggest deficit	•Schools •Platform •Students •Content •Usage	•Perception of use identified •Physical, technological, and virtual setting description •Description of stakeholders •Teachers' characterization of problems and solutions with integration
10	•i-Ready, Read 180, Academic enrichment, Rotation station •Flagged students •focusing on •educational technology programs •Student	•We use it to do assessments.	•New, creative, and interventive ways •Thought it was a good thing.	•Programs •Features •Students •Technology •Usage •Thought •content	•Description of stakeholders •Physical, technological, and virtual setting •Identification of innovation used and the quality of use •Thought process/ partners

After coding, categorization, and pattern identification, I identified themes, or patterns of meaning, derived from participants responses (Table 5). I compared the identified patterns and trends from Table 1 and Table 4, queried and reexamined the data for absences to derive themes from participants verbalized experiences and perceptions. Both methods of analysis, CBAM process analysis and content analysis, used the same data and themes were derived from the same patterns identified in Table 5.

Table 5

Comparison of Themes by Method of Analysis

Patterns	Themes that stem from outcome of CBAM process analysis related to cultural-historical activity	Themes that stem from content analysis
•Perception of use identified •Identification of innovation used and the quality of use •Perception of features, programs, and platforms provided •Thought process/ partners •Teachers' characterization of problems and solutions with integration •Characteristics and quality of use identified •Standards and Content area specific usage •Perception of features, programs, and platforms provided •Physical, technological, and virtual setting description •Description of stakeholders	•Teachers acting in isolation •Teachers acting as information seekers •Teachers sharing information •Teachers seeking knowledge of programs or platforms to use or replace •Teachers collaborating with others on use, planning, evaluating, reflecting, or seeking knowledge. •Teachers evaluating •Teachers make no or minor changes •Teachers' current use of innovation based on frequency, experience, and knowledge •Teachers' experience, knowledge, and evaluation of innovation influence on changes in use •Teachers' use of reflections •School or instructional setting's influence on •Teachers' mindset and levels of use	•Teachers value innovation •Teachers' perception of levels of experience with innovation •Teachers' desire to seek and obtain information about innovation •Voluntary or involuntary adoption of innovation •Teachers' reflections on use of innovation •Teachers' attitudes on information sharing •Teachers' perception of innovation usage prior to pandemic/post pandemic •Teachers' desire to change usage of innovation based on knowledge and instructional experience. •Teachers' perceptions of role of schools, in person or virtually

In Table 5, there are two sets of themes derived from the data analysis: one set representing the outcome of the CBAM analysis related to the cultural-historical activity of the participants and one set representing the outcomes of a content analysis in Table 4 of the participants' own words describing their actions and their values. In Table 6, the research question, sub questions, themes, and correlating transcriptional evidence based on the participants' levels of use are presented to illustrate the process of integrating two sets of themes from the initial, automatic, in vivo, process, and value codes, to categories, to patterns, to themes. For example, in Table 6, the theme, *teachers value innovation*, assisted with responding to the main research question and was derived from the Table 4 value codes and the categories: usage, platforms, programs, and technology. The theme, along with the evidence presented in Table 6, shows how teachers feel about the innovation and helps to show their understanding of how this valued innovation impacts the integration of educational instructional technology.

The evidence is presented by level of use in Table 6 because, depending on the level of use, a participant's valuing of educational instructional technology could be as an organizational tool (Mechanical) or as an enhancement (Refinement). So, depending on how the participant valued or used the innovation impacted the integration of educational instructional technology. In addition, in Table 6, the evidence is presented by level of use because there were thematic conflicts. For instance, two themes identified in Table 5, "teachers acting in isolation" and "teachers sharing information" conflicted. The conflict occurred as a result of levels of use reporting: Mechanical to Refined users acted in isolation and Integrated to Renewal users collaborated and shared information frequently.

Table 6

Research Questions, Related Theme(s), Evidence by Level of Use

Research Questions	Themes	Evidence by Level of Use
RQ1: How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their respective classrooms?	•Teachers value innovation •Teachers' perception of levels of experience with innovation •Voluntary/involuntary adoption of innovation •Teachers' perceptions of resources	•Mechanical Use: "Platform just to like put in all my resources" •Routine Use: "I believe that is important that we utilized technology in schools." •Refinement: "enhance their learning and not just be used as a substitution of paper and pencil," "enhanced the lesson," •Integration: "I think instructional technology allows for small group learning and more individualized learning so students can actually get the instruction that they need when it's used correctly." •Renewal: "Yes, I have used Promethean boards, iPads, Desmos, Nearpods, just about anything that allows technology to be infused with their learning styles."

Research Questions	Themes	Evidence by Level of Use
RQ1a: What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?	•Teachers acting in isolation •Teachers acting as info seekers/ desire to seek info •Teachers evaluating innovation •Teachers make no, minor, or major changes in use of innovation •Teachers' reflection of innovation usage •Teachers current use of innovation	•Mechanical Use: "Not currently looking for information," •Routine Use: "Before Covid, I wouldn't have done my lesson on Nearpod. I wouldn't have done it on Pear Deck, or I wouldn't have used these kinds of activities." "Even though we live in a world of technology, some kids only know how to use specific apps they don't really know how to type or just really navigate through technology." •Refinement: "I think as far as information goes, overall, I would just be looking for more opportunities to learn how to use different types of instructional technology." "I am individualizing student lessons in relation to whatever their proficiency levels within the Common Core standards. I create modules where students can receive individualized instruction." •Integration: "So, this for me became a strength in that I had to learn all these different ways to be able to reach our kids and to do that successfully and was a lot of trial and error." •Renewal: "Really look for expanding knowledge and extrapolating data really to move beyond what the general classroom." *Table continues…*

RQ1b: What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?	•Teachers' perception of resources •Teachers' perception of role of schools	•Mechanical Use: "They have a school issued computer and if we're able to do this stuff together at the same time and I can show them and they can do it along with me, then they understand exactly what I'm talking about." •Routine Use: "A big component of using instructional technology, especially in buildings that have a higher rate of truancy with students who have trouble with getting to school in the physical sense is providing them a platform where they can still get the information needed to be able to be proficient." "My changes … adapting and making some adjustments." •Refinement: "I did a couple of grants to try to secure better equipment for myself and for my students. I gave constant feedback to District X public schools in regard to some of the platforms that we were using. Things that needed to be addressed." "I think there's you know ways that you can streamline these things." "Just fine tuning what we have right now is really where my mindset is." •Integration: "I made changes not within my personal class. I think it's more of a collaboration. I think I've been able to make some curriculum changes or some adoptions of different problem-based types of things." •Renewal: "I am going to constantly try to work on finding new and creative and interventive ways for my students to learn. So, I know that as technology changes, as these apps change, and the district rolls in new mandates and the types of apps we use changes that I will constantly have to grow in this area no matter what." "Towards the latter part of the year, I did make some changes. Uhm, but I'm going to try to implement some of the things that I have found into the new school year."

Research Questions	Themes	Evidence by Level of Use
RQ1c: How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?	•Teachers collaborating •Teachers acting as info seekers/ desire to seek info •Teachers' perception of role of schools	•Mechanical Use: "This past school year it was the major platform for which we distributed our content." •Routine Use: "During the 2021 school year the majority of instruction was online due to the Covid-19 pandemic and classes were held via Microsoft Teams and we also used platforms such as Canvas for students to access work and complete assignments and that could include assessments, quizzes and just class assignments we used." "Once we get back into population, there may be some changes."

Table continues…

	Refinement: "The type of technology that we will be implementing will change, but at the implementation level and dependent upon the needs of the staff and the students will dictate what types of changes." Integration: "I think constantly working together by keeping that line of communication open and she [co-teacher] finds some kind of information on using those educational technology programs in our classroom." "My whole department works with or has these programs, and they use all of them in their classrooms." Renewal: "Norm throughout the entire class school building"

Evidence of Trustworthiness

While Chapter 3 outlined and examined the issues of trustworthiness, this chapter provides the evidence. Trustworthiness is a key aspect of qualitative research. It includes credibility, transferability, dependability, and confirmability.

Credibility

As presented in Chapter 3, member checking; reviews by the dissertation committee and Dr. Gene Hall, who is one of the creators of CBAM; the Walden University Institutional Review Board; and methods triangulation were used to ensure credibility and validity. Theoretical analysis was compiled using CHAT. All participants were asked the same questions in the same order as outlined in the LoU Interview Protocol. A qualitative data audit was conducted, which involved providing Dr. Gene Hall and his colleagues of C-PEER (Center for Practice Engaged Education Research) the LoU Rating Sheets for each participant (Appendix J). The LoU Rating Sheets, as outlined in the CBAM LoU Training Certification Letter (Appendix I: CBAM LoU Certification Letter), demonstrated my reliability in rating data related to each Category and Decision Point on each of the 10 participants LoU Rating Sheets (Appendix J) and demonstrated

my ability to holistically determine the Overall LoU rating of each of the ten interviews. The qualitative data audit was conducted along with member checking, which entailed the teacher participants reviewing their responses. Member checking provided the teacher participants with the chance to confirm, fix errors, and raise concerns about interpretations of their responses, and it provided the researcher a chance to summarize study findings. The member check form for participants is presented as Appendix G. Also, a data saturation grid (Appendix L) was used and completed to determine when an ample sampling had been compiled, further enhancing data credibility. Saturation was adequately achieved and the redundancy of information within the data made that evident. Participants were debriefed using a one-page summary of the findings via Microsoft Teams.

Transferability

Transferability involved sampling to vary participant selection and lay the groundwork for acquiring thick descriptive responses. This study involved criterion-based purposive sampling, and a data saturation grid (see Appendix L) was used to determine the breadth and depth of data saturation. Thick and rich descriptions include a detailed accounting of each teacher participants' LoU interview responses (see Creswell and Creswell, 2017). The thick and rich descriptions acquired for analysis provided meaning as well as cultural and social contexts for addressing the four research questions. Despite a global pandemic and other challenges encountered during sample construction and data collection, the quality of the data has enough breadth and sufficient depth for considering some applicable degree of generalization from the study.

Dependability

Concerning dependability, an audit log (see Appendix K), which was comprised of the interview notes written on each of the participant's rating sheet (see Appendix J) and additional field notes (see Appendix K) was kept and stored securely. The log was used to track data collection and analysis (see Creswell & Poth, 2016; Merriam & Tisdell, 2016; Yin, 2014). The recruitment process as well as data collection were consistent and the same for all. Data triangulation, which involved using the interview transcriptions of the 10 participants from three to four different P-12 schools in District X using the same interview method, CBAM's LoU Interview Protocol and theory triangulation, which involved using two theoretical perspectives (CBAM and CHAT) to analyze the study data were used to collect and analyze the data from the various participants to justify the identified themes and patterns. Creswell and Poth (2016) suggested that when themes and patterns are derived from a merging of data from multiple sources or participants, the process provides validity to the qualitative study.

Confirmability

This study's confirmability derived from using the CBAM diagnostic tools and related resources that have been used in many qualitative studies (Hall et al., 2006). Also, reflexivity was acknowledged and addressed. As a result, I remained aware of my role and clearly understood how my biases and level of research experience might be influencing this study and its findings (see Creswell & Poth, 2016). My role and interactions with participants and the collected data had to be clear and as objective as

possible, which is why an audit log (see Appendix K) was kept. In addition, no changes or alterations were made by me to transcriptions or interview data.

Intra- and Intercoder Reliability

The use of CBAM's LoU Interview Protocol required months of training and certification. Certification involved submitting the audio recordings of the interviews for a peer review of the ratings for each participant. The ratings matched the ratings of Dr. Gene Hall and his colleagues of C-PEER (Center for Practice Engaged Education Research) and the interview notes were deemed adequate to justify the ratings. Because of the success of the peer review, certification was obtained (Appendix I).

Results

In this section the main research question and its sub questions were examined and discussed within the context and relationships of the themes and evidence from the transcripts presented in Table 6. The examination led to multiple observations and several findings. The findings or results presented in Table 7 below, tend to support the findings of other related studies with a few new or developing perceptions of the phenomenon. In addition, the key themes presented below are the themes that are strongly relevant to the field of education. The others were omitted from Table 7, because they were not.

In Table 7, the research questions, key themes, observations/ findings are presented. The research question for RQ1 is: "How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their

respective classrooms." There were two key themes associated with this research question: *teachers value innovation* and *teachers adopt innovation* during the pandemic.

Table 7

Research Questions, Key Themes, Observations and Findings

Research Questions	Key Themes	Observations/ Findings
RQ1: How do teachers describe their understanding of how and why, despite access to educational technology and research data, they are reluctant to integrate educational instructional technology in their respective classrooms?	•Teachers value innovation •Teachers adopt innovation during pandemic.	• Teachers value educational instructional technology, but user acceptance varies with user levels of use. • Teachers adopted educational instructional technology, because of the Covid-19 pandemic.
RQ1a: What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?	Teachers act in isolation.	Teachers experienced using educational instructional technology independently more than collaboratively.
RQ1b: What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?	Teachers perceive role of schools as a direct influence.	•Teachers perceive the role of schools differently based upon funding of educational instructional technology. •Teachers perceive the role of schools differently based upon instructional technology availability. •Teachers perceive the role of schools differently based upon choice of educational instructional technology.
RQ1c: How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?	Teachers collaborate to use the innovation with colleagues to achieve a collective impact on students.	Participant understanding of local school culture related to technology integration is related to user status.

The first thematic label refers to the 10 participants repeatedly using descriptive words that demonstrated their valuation of the innovation, educational instructional technology. Teachers shared that they value educational instructional technology, but their descriptions demonstrated that their levels of experience or use of educational instructional technology varied from Mechanical to Renewal. As presented in Table 6, one Mechanical user described how the innovation served as a "platform just to like put in all my resources;" a Routine user " believe[d] that is important that we technology in schools;" a refined user stated that the innovation "enhance[d] their learning" and "enhanced the lesson;" the Integrated user stated that "instructional technology allows for small group learning and more individualized learning so students can actually get the instruction that they need when it's used correctly;" and the renewed user "used Promethean boards, iPads, Desmos, Nearpods, just about anything that allows technology to be infused with their learning styles." While the teachers provided positive descriptions of the innovation (e.g., "beneficial," "an amazing resource"), they shared that they value educational instructional technology in relation to their levels of use and experience with educational instructional technology.

The second key theme associated with RQ1, *teachers adopt innovation* during the pandemic is used by me to explain how nine of the 10 participants, excluding the past user, integrated educational instructional technology because of the Covid-19 pandemic and the school district shifting from in person to virtual learning for the 2020-2021 school year. A Mechanical user stated, "So, during the 2021 school year, the majority of the instruction was online due to the Covid-19 pandemic and classes were held via Microsoft

Teams, and we also used platforms such as Canvas for students to access work and complete assignments." A Refined user stated, "To get across to students' different things that we're learning, being in this pandemic right now that using technology has been our key using such platforms, like Canvas on Clever, Flip Grid. Flocabulary, you name it, has been our way of connecting with our students."

The first sub-research question, RQ1a, is: "What are teachers' attitudes, beliefs, experiences, preferences, and perceptions regarding the integration of contemporary instructional technologies in their respective classrooms?" The key theme is *Teachers acting in isolation*. Eight of the 10 participants described teaching in isolation from their colleagues, with little to no information sharing or collaboration surrounding the integration of educational instructional technology. In Table 6, the Refined user stated, "I think as far as information goes, overall, I would just be looking for more opportunities to learn how to use different types of instructional technology." The Refined user also stated, "I am individualizing student lessons in relation to whatever their proficiency levels within the Common Core standards. I create modules where students can receive individualized instruction;" and the Integrated user said that "This for me became a strength in that I had to learn all these different ways to be able to reach our kids and to do that successfully and it was a lot of trial and error."

The second sub-research question, RQ1b, is: "What are teachers' perceptions regarding administrative, institutional, technical, professional, and financial challenges for the use of instructional technology in their respective classrooms?" The sub-research question is also the theme. The 10 participants' perceptions varied regarding

administrative, institutional, and professional challenges for the use of educational instructional technology pertained to funding, technology availability, and choice of educational instructional technology. The 10 participants' perceptions regarding technical and financial challenges varied based on the availability of funding and technology for teachers and students and amount of choice the teachers had in which programs, platforms, or features they could use. In Table 6, one Mechanical user voiced that "they have a school issued computer and if we're able to do this stuff together at the same time and I can show them and they can do it along with me, then they understand exactly what I'm talking about;" a Routine user described how "a big component of using instructional technology, especially in buildings that have a higher rate of truancy with students who have trouble with getting to school in the physical sense is providing them a platform where they can still get the information needed to be able to be proficient;" the Refined user reported that "I did a couple of grants to try to secure better equipment for myself and for my students. I gave constant feedback to District X public schools in regard to some of the platforms that we were using. Things that needed to be addressed;" and the Renewed user stated, "I am going to constantly try to work on finding new and creative and inventive ways for my students to learn. So, I know that as technology changes, as these apps change, and the district rolls in new mandates and the types of apps we use changes that I will constantly have to grow in this area no matter what."

The third sub-research question, RQ1c, is: "How do teachers perceive the role that local school culture plays in discouraging or encouraging the use of instructional technology in the classroom?" The key theme associated with this research question is

Teachers collaborate with colleagues. This theme applies to two participants, the Integrated and Renewed users, and conflicts with the key theme of isolation common among all other participants. The Integrated user stated, “I made changes not within my personal class. I think it's more of a collaboration. I think I've been able to make some curriculum changes or some adoptions of different problem-based types of things.” The Renewed user stated, “Really look for expanding knowledge and extrapolating data to really move beyond the general classroom.” Even though only two of the participants collaborated with their peers, the collaboration still illustrates change. Those two teachers were able to collaborate despite 80 percent of the participants worked in isolation.

Discrepant Cases

There are discrepancies that were identified after data analysis and a review of the literature presented in Chapter 2. The discrepancies are derived from the juxtaposition of the first finding presented in Table 7: *Teachers value educational instructional technology*. Although there was wide support for the use of instructional technology, personal user acceptance varied with user levels of use (Mechanical to Renewed). For example, some participants’ responses—across all levels of use—presented in Table 6 describe the benefits of adopting or integrating educational instructional technology. Some of the users stated that it “is important that we used technology in schools,” “enhance their learning and it not just be used as a substitution of paper and pencil,” and “instructional technology allows for small group learning and more individualized learning so students can actually get the instruction that they need when it's used

correctly.” This discrepancy illustrates the degree of contradiction or juxtaposition of the teachers’ personal acceptance and valuation of the innovation by level of use.

Another apparent discrepancy was the conflict that resulted from the participants’ levels of use. The prevailing theme for RQ1a, *teachers act in isolation,* was shared by 8 of the 10 participants, Mechanical to Refined users. That theme appeared to conflict with the key theme for RQ1c, *teachers collaborate to use the innovation with colleagues to achieve a collective impact on students,* shared by the Integrated and the Renewed users. However, when considered within the context of the literature and the conceptual framework, as I have done in Chapter 5, this becomes an important finding that helps explain the research problem of the study: Why many public-school teachers, despite access to instructional technology and research data, are reluctant to integrate instructional technology in their respective classrooms.

Summary

In the chapter, the researcher outlined and described the data provided by 10 participants from District X as well as the setting, demographics, data collection that transpired over 4 months in 2021, data analysis, evidence of trustworthiness, and the results of the analysis of the collected data. The study was completed in the manner described in Chapter 3 with one irregularity, Covid-19, that was discussed by many participants during data collection.

There was one main research question and three sub questions that were presented along with observations and findings. The answers to RQ1 provided from the combined CBAM and content analysis results are that teachers shared that they value educational

instructional technology but they described that their levels of experience or use of educational instructional technology varied from Mechanical to Renewal, and teachers adopted educational instructional technology because of the Covid-19 pandemic. The answer to RQ1a is participants described teaching in isolation of their colleagues, with little to no information sharing or collaboration surrounding the integration of educational instructional technology. The answer to RQ1b is that teachers had varied perceptions regarding administrative, institutional, and professional challenges for the use of educational instructional technology pertaining to funding, technology availability, and choice of instructional educational technology. The answer to RQ1c is it was observed that the participants experiences were more in isolation (eight out of 10 participants) than in collaboration with colleagues (two participants).

Chapter 5 provides the interpretation of the findings, the limitations of the study, recommendations, implications for positive social change, and the Conclusion to the study.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative study was to understand better how and why, despite access to educational technology and research data, many teachers are reluctant to integrate educational instructional technology in their respective classrooms. In most U.S. school systems, teachers can choose to use traditional methods of instruction, or they can opt, most times, to use alternate or innovative methods, which typically rely upon the use of contemporary technology (Cuban, 2013). It is important to learn from teachers the meaning or reasoning involved in choosing or avoiding certain instructional methods. Professional development, instructional practices, student engagement, and academic achievement are negatively impacted by the lack of implementation (Al-Ali,2021; Hofmann et al.,2021). Better understanding the how and why many teachers are reluctant to integrate educational instructional technology is important for educational reform and to better comprehend why proven instructional methods are not being implemented is essential.

The findings of the current study revealed that the 10 participants value educational instructional technology, but user acceptance varied with levels of use. Teachers experienced using the innovation independently or in isolation more than collaboratively. The participants perceived the role of schools differently with their personal understanding focused either on funding, technology availability, or choice of educational instructional technology. The teachers' understanding of local school culture related to technology integration was related to enhanced user status that stemmed from

the forced change on the status quo and adoption of the innovation during the Covid-19 pandemic.

Interpretation of the Findings

This section includes a description of how the findings confirm or extend knowledge in the field of education pertaining to the adoption or integration of educational instructional technology. First, a description and an explanation are provided of the findings interpreted within the context of the conceptual framework. The conceptual framework is composed of CHAT and CBAM. Secondly, a description and an explanation of the findings interpreted within the context of the peer-reviewed literature presented in Chapter 2 are offered.

Findings Interpreted within the Context of the Conceptual Framework

CHAT is the sociocultural theory used to support the conceptual framework for this study. Here, the findings have been interpreted within the context of CHAT and its components: subject, tools, object, and community (see Figure 1). I selected CHAT as the framework to study and investigate the changing perspectives of the teacher participants because it permitted the analysis of the different relationships within the systems prepandemic, last school year, in the future, and as it evolves. Gonzalez et al. (2021) influenced my decision to use CHAT by pointing out that, “dealing with change is an ongoing process that connects us to the past, present, and future, the historicity principle of Engestom’s model” (p. 2). Also, CHAT was not only selected to study the perspectives of the teacher participants, but also to analyze the interconnected cultural, historical, and social activity issues that surfaced during data analysis.

I selected CHAT because it allowed me to investigate the contradictions, tensions, and issues that arose from the findings and observations during data analysis (see Al-Ali, 2021; Lim, 2019). Al-Ali (2021) altered the discussion by stating that "the interconnected nature of human activity and the environmental factors (which include other activities) that can greatly affect an activity" (p. 53), like the adoption or integration of educational instructional technology influenced the participants' actions regarding educational instructional technology The unexpected introduction of the pandemic situation among the participants accelerated user change to the degree that nine of the 10 participants adopted and integrated educational instructional technology. Additionally, as described by Al-Ali and Trust (2017), the change, the insertion of the pandemic into the classroom objectives and learning environment, demonstrated the reasoning underpinning the teacher actions (the conscious implementation of contemporary instructional technology or the decision not to) based on interactions or experiences within the activity system (the individual classrooms in each school of District X).

A second part of the conceptual framework was CBAM. CBAM also permits a researcher to evaluate the issues that arose from the findings and observations. I chose CBAM as the framework to analyze and describe the teachers' levels of use in relation to the adoption and integration of educational instructional technology. Using the LoU Interview Protocol, CBAM guided the interviewing and questioning of teachers on how, why, or if they implement instructional technology. CBAM allowed for the analysis and interpretation of the study findings that demonstrate and describe how individual

teachers' actions and perceptions connected to the use (adoption and integration) of the innovation (see Mohammed Al Masarweh, 2019).

The outcome of the CBAM LoU process coupled with the content analyses of the interview data indicated that at a minimum the nine participants, excluding Participant #4, the nonuser, had implemented educational instructional technology in their classrooms within the past school year during the pandemic. The participants differed in the levels of implementation, reflection and collaboration, frequency of change, or adaptation of the use of educational instructional technology. This variance in usage occurred because of the environmental emergency shifts in the modes of instruction due to the mandate for virtual learning during the pandemic. According to Nair and Rajappan (2021, p. 209):

> As virtual platforms are the need of the hour, many teachers are faced with the difficulty of handling technology, which is completely an alien thought to many teachers. Being used to face to face communication, this sudden transition has left many baffled. If left unattended, these concerns might elevate to higher levels, ultimately affecting the quality of education.

While teachers choosing to implement educational instructional technology is desired, it is problematic to not address the sudden and unexpected shift by teachers away from the status quo. Teachers implementing the innovation is problematic because it took a pandemic for them to behave differently. Also, this shift from the status quo did not ensure that the teachers' perspectives regarding educational instructional technology changed, just their response or actions based on the sudden environmental shift.

The levels of use illustrate the degree of influence (attitudes and issues) from the environmental shifts (in person to virtual back to in person). In addition, the levels of use illustrate the degree of resistance to the environmental shifts. Nair and Rajappan (2021) concluded that "Effective handling of resistance enables to reap the complete benefits of the innovation" (p. 211). The Mechanical users focused only on the daily implementation of the innovation, not on reflection of their use or how they could improve implementation for their students' academic success long term or with the future in mind and they were the most basic users of the innovation; as a result, collaboration, and evaluation of the use of educational instructional technology did not occur.

The Mechanical users did not maximize the use of the innovation either because of lack of knowledge, funding, resources, a culture of adoption and integration of the innovation, or all the above. The Routine user was a more stabilized user, but this participant reflected very little on the process of implementation, collaborated either minimally with colleagues or school administrators or not at all, and may have been receptive to learning more about the innovation, but did not initiate obtaining new knowledge.

The three Refined users reflected and paid more attention to implementing educational instructional technology by making minor changes to potentially improve implementation for students' engagement, motivation, and academic success. The Integrator, who collaborated with at least one other teacher pertaining to the implementation of educational instructional technology, made changes to the implementation of educational instructional technology to improve academic progress for

students and pursued opportunities to learn more about educational instructional technology, its associated platforms, programs, and features.

Finally, the Renewed user reflected on implementation and made major changes or replacements to the implementation of educational instructional technology with the students' academic needs as the priority. This participant even shared that based on experiences, attempts to solve associated challenges, collaborating, and information seeking and sharing, that the integration of the innovation would involve using a more useful application like Open PE to plan, instruct, and further reflect on the use of the innovation. The findings and observations that stem from the CBAM LoU, as Nair and Rajappan (2021, p. 211) had indicated, provided the information needed to identify the "requirements and special needs of the individuals involved in the change process and help to devise suitable plans of action to attend to these needs." With the participant being a Renewed user, the participant still chose to adopt, integrate, and make major changes in implementing educational instructional technology in the classroom despite the environmental shifts caused by the pandemic.

The findings that stemmed from the CBAM LoU data analysis provided the information needed to determine the depth of use of educational instructional technology by the teacher participants. Excluding the nonuser, the participants adopted or implemented educational instructional technology in the classroom. The majority of participants implemented the innovation minimally and focused on using instructional technology on a day-to-day basis versus the Renewed user, who implemented instructional technology maximumly despite the environmental shifts. The findings that

stemmed from the CBAM LoU data analysis provided information needed to answer the research questions, but CHAT, the other component of the conceptual framework, was used as well to interpret the data. The findings that stemmed from the CHAT data analysis were studied to understand the teachers' cultural and historical motivations, and their preferred methods of implementing educational instructional technology.

CHAT postulated that human activities can be described and studied by researchers based on the dynamics of motivation, societal norms and rules, and the method of performing those activities (Al-Ali, 2021; Hofmann et al., 2021; Lim, 2019; Marshalsey & Sclater, 2020). Based on CHAT, themes emerged during data analysis pertaining to subject-object (teachers' attitudes toward implementation of innovation), subject-tool (teachers' attitudes toward educational instructional technology), and subject-rules (teachers' attitudes toward policies of District X).

The themes that emerged pertaining to subject-object were that teachers were more willing to adopt the innovation if it benefitted them, met their instructional or professional needs, or served to engage, interest, or motivate students during virtual learning or on their returned to in-person instruction. The themes that emerged pertaining to subject-tool were that teachers embraced educational instructional technology when it was available for students in the classroom either one-to-one or in small groups. Teachers found that students liked using the tools and educational applications to learn and that they wanted to learn more about the innovation or how to find more applications that met many of the needs of the students. The themes that emerged pertaining to subject-rules were that many teachers felt the rules, policies, or mandates of District X changed

frequently, so they felt and expressed a need for more innovation training, more innovation resources, and more consistent or simpler policies regarding the availability, choice of platforms, and funding of educational instructional technology.

Covid-19 caused the questioning and changing of the rules and division of labor with each school and District X that regulate teacher guidance and agency (see Barma et al., 2021). The contradiction of findings, 70% of participants describing teaching in isolation and 20% in collaboration, illuminated how Covid-19 caused tensions with the representation of CHAT (subject, object, community, rules) thereby impacting the degree of individual teacher and collective (school stakeholders and District X) communication and organization (see Barma et al., 2021). The tensions that stemmed from the pandemic and influenced communication and organization included the abrupt halt to in person instruction in March 2020, the continuation of full time virtual instruction up to March 2021 and the full return to in person instruction August 2021. Additionally, there were adjustments and modifications to the rules and routines of daily school life, teachers' mental state, relationships (teacher to teacher, teacher to student, etc.), and the tools used by teachers. Barma et al., (2021) pointed out that prior to the pandemic, teachers would have been encouraged to interact with other community and school stakeholders and the multiple activity systems would have formed a network with a collective motive and the sharing of information and knowledge; then boundaries were crossed and collaboration was preferred. During the pandemic that networking or collaboration was less likely to occur because teachers were home alone and, even when they returned to in person instruction, rules or mandates dictated social distancing. So, the findings support not as a

discrepancy but rather as part of the new status quo of the pandemic that 70% of the participants taught in isolation, but when they were still able to cross the boundaries between community, familial, and school groups, collaboration and information sharing occurred.

Providing an adequate summary of the CHAT environment, one participant stated, “The majority of the instruction was online due to the Covid-19 pandemic and classes were held via Microsoft Teams, and we also used platforms such as Canvas for students to access work and complete assignments.” Proponents of CHAT (e.g., Al-Ali, 2021; Hofmann et al., 2021) have suggested that based on the dynamics of the pandemic-dominated learning environment, the perspective of the teachers and their understanding of the required actions to help the students were substantially influenced such that their description of the process of learning was altered—beneficially of adversely.

Findings Interpreted Within the Context of the Literature

In Chapter 2, researchers described in their literature how teachers are not focused on the benefits of instructional technology for improving student academic achievement, and described instructional technology as being used operationally, within curriculum, and socioemotionally (see Burke et al., 2018; Cuban, 2013). The researchers in their literature also described how teachers in P-12 settings use instructional technology as an aid and not as an instructional tool. Stewart and Stewart (2013) stated that “when technology is incorporated into instruction and teaching, effective methodologies need to be used to integrate technology during high-quality instruction to diminish student disinterest or instructional technology being used for non-academic purposes” (p. 138).

The anticipated reference-based outcomes were that (a) the participants would opt to not adopt or integrate the innovation despite the benefits of instructional technology, as suggested by Demir and Akpinar (2018), Kotluk and Kocakaya (2017), and Li et al. (2015); (b) that if the participants adopted or integrated educational instructional technology, then they are only using the innovation in a brief, ineffective, inconsistent, or limited capacity like a Mechanical or Routine user as suggested by Burke et al. (2018), Chien et al (2016), Christensen and Knezek (2017), Cuban (2013), and Jack and Higgins (2019); (c) that participants would not adopt or integrate the innovation because of their levels of experience or use, depth of technical knowledge and confidence, and school or administrative priorities and support as proposed by Bozkurt et al. (2014), Kalonde and Mousa (2016) and Li and Choi (2014); and, (d) that the participants' cultural, environment and personal challenges would hinder their adopting or integrating of the innovation. The researchers above provided insight into some of the reasons teachers before the pandemic chose not to adopt instructional technology and based on the literature of other researchers discussed in Chapter 2, more concerns were described by researchers that were analyzed to interpret the findings.

Petko et al. (2018) proposed that accessibility, the complexity of instructional technology, teachers' attitudes, and level of training would be insufficient enough to persuade the participants of the study to use educational instructional technology, despite knowing the benefits of adoption and integration. Similarly, the early or initial expectations suggested in the pre-pandemic literature (see also, Li &Choi, 2014) were that most of the participants would not adopt or integrate the innovation, but the

pandemic and all the challenges and shifts that stemmed from it altered the setting. I identified and described how the findings in Chapter 4 confirm and extend knowledge in the field of education, specifically pertaining to teachers' adoption and integration of educational instructional technology in comparison to the findings of the peer-reviewed literature.

The apparently conflicting key findings I described in the Chapter 4, Discrepant Cases appear to disconfirm what people are prone to think about teacher decision making regarding instructional technology use, but this study confirms that teachers are acting in accordance with the nature of their personal experiences. Cuban (2013) shared that social, professional, administrative, and other school stakeholders can limit teachers' agency in the classroom and the practice of changing or altering teachers' mindsets or practices has been "the dominant policy strategy to improve classroom instruction" (p. 8). This study confirms that the teacher participants acted in accordance with the nature of their personal experiences, to the limiting of their agency, and continued attempts to change their thinking and instructional practices by other stakeholders.

During data collection for this study, the Covid-19 pandemic drove, and largely validated, policy strategy, thereby compressing the timeframe for innovation change. Al-Ali (2021) concluded that teaching during the pandemic and the adoption and integration of the innovation were influenced by the demands imposed, the needs derived from "the pandemic-generated learning environment," and "abrupt and frequent changes" that created a survival learning environment (p. 102). One of the findings associated with subresearch question RQ1a is that seven participants (the Mechanical to Refined users)

described experiencing the innovation independently or teaching in isolation from their colleagues, with little to no information sharing or collaboration surrounding the integration of educational instructional technology. That finding appeared to conflict with the key finding for RQ1c, *Teachers collaborate to use the innovation with colleagues to achieve a collective impact on students* shared by the Integrated and the Renewed users.

The two findings related to RQ1a and RQ1c extend the knowledge of the adoption and integration of the innovation in education by influencing each other. The Covid-19 pandemic altered the rules or District X school implicit and explicit conventions, norms, standards, and policies (individually and collectively) and division of labor (tasks, power, and status) at the schools of District X (see Sannino & Engeström, 2018). Sannino and Engeström (2018) suggested that an event, like Ebola in the early 2000s and like the Covid-19 pandemic-induced changes in rules for District X schools, triggered a change in the division of labor for all school stakeholders, specifically teachers regarding the object or implementation of the innovation. Al-Ali (2021) and Hofmann et al. (2021) altered the discussion by stating that the pandemic thus precipitated the creation of new school policies and new ways of teaching. This shifted the why, when, where, and how instruction occurred (Gonzalez et al., 2021). Marshalsey and Sclater (2020) pointed out that with the pandemic-based rules and division of labor, teachers were more inclined to work in isolation, even if collaboration with colleagues was desired, because they were not allowed to be physically present in the school nor classroom and because teachers struggled to focus on collaborating, planning, and teaching while at home.

Participant understanding of local school culture related to technology integration is connected to user status. Teachers perceived the role that local school culture played in either discouraging or encouraging the use of educational instructional technology depended on time, instructional space, teacher choice and voice, management, logistics, the availability of resources and funding, and administrative support. The teachers' understanding of local school culture related to technology integration is related to enhanced user status that stemmed from the forced change on the status quo and adoption of the innovation during the Covid-19 pandemic. Teachers had to quickly adjust to the pandemic-driven rules, division of labor, and community-based shifts in their instructional environment and the integration of educational instructional technology to address many of the challenges that arose to meet the instructional goals and needs of the schools. Hofmann et al. (2021) suggested that based on the schools encouraging and working on the boundaries and tensions associated with the Covid-19 pandemic, some schools were able to "achieve transformative agency to address problems through the mechanism of double stimulation and the use and creation of locally relevant tools" (p. 50). The primary (protocols, guidance) and secondary tools (educational instructional technology, technology platforms and programs, models) created and selected by District X administrators were used to shift the direction of instruction regarding the funding of it, the availability of instructional technology, and the teachers' choice of educational instructional technology after the introduction of the pandemic and to open the door to a shift in the adoption and integration of the innovation in the schools postpandemic (see Hofmann et al., 2021). This interpretation challenges prepandemic literature (e.g., Burke

et al., 2018; Cuban, 2013), yet corroborates the current, pandemic-influenced literature and studies (Al-Ali, 2021; Hofmann et al., 2021). Without the influence of the pandemic, for collaboration to have occurred for most of the participants, optimal conditions (funding, technology availability, and choice of innovation) would have needed to exist at each school and in order to continue to have or increase collaboration clear, scaffolded contingency plans would need to have been developed (see Al-Ali, 2021; Hofmann et al., 2021).

Based on the key findings associated with RQ1a and RQ1c, while teaching in isolation occurred most often, collaboration did occur for two participants. The pandemic-generated environment did not alter the collaborative efforts of two teacher participants. The two users were not adversely affected because many of the tensions or challenges described by the other users did not exist to the same degree for these two participants. The two participants worked at schools that had provided the sociocultural norms, policies, resources, time, opportunities to collaborate frequently, and funding to provide the necessary tools teachers needed to successfully use and support the adoption and integration of the innovation. As explained by Hofmann et al. (2021), when teachers and schools can (a) identify the challenges and factors presented during the pandemic that influence teachers' decision making regarding the adoption and integration of the innovation, and (b) identify and provide tools (programs, platforms, and applications) "to facilitate teacher noticing and collaboration," users' performance and collective efforts are exhibited (p.55).

This interpretation supports the pre-pandemic literature of Kaniuka (2009) and Hord and Hall (2011) and extends the findings of the current pandemic-based literature of Al-Ali (2021) and Hofmann et al. (2021). Kaniuka (2009) proposed that collaboration between teachers and innovation is necessary to improve academic achievement and school systems and according to Hord and Hall (2011), the successful implementation of educational instructional technology relies on each teacher's comprehension and understanding of the value of such innovations to facilitate and improve their students' instructional experiences. Al-Ali (2021) proposed that because the Covid-19 pandemic has not concluded and it is possible that another pandemic will occur, "clear and flexible contingency plans" are needed to increase, encourage, and sustain teacher and school collaboration efforts (p. 281). Hofmann et al. (2021), proposed that the pandemic has required the creation and testing of new rules, tasks, and approaches to teaching that provide schools and teachers with new insights that when studied collaboratively can contribute to sustainable teacher adoption and integration of educational instructional technology. Similar to the prepandemic literature(Al-Ali, 2021), this interpretation of the findings of current pandemic-based literature extends the notion that teachers more sustainably integrate and implement educational instructional technology at higher levels of use when they better understand and collaborate pertaining to instructional technology.

Also, regarding the key finding associated with RQ1c, *Teachers collaborate to use the innovation with colleagues to achieve a collective impact on students*, the participants' perceptions of the role of school culture in influencing teacher collaboration varied based on the level and type of user. Dele-Ajayi et al. (2021), proposed that

"teachers are more likely to successfully navigate and tackle first-order [external] barriers like lack of administrative and technical support if they have overcome second-order [internal] barriers like attitudes and belief about technology" (p. 3). So, the participants who are lower level (III-IVB) or Mechanical to Refined users were minimally successful tackling external barriers, because they had overcome minimal internal barriers. Conversely, the higher level (V-VI) or Integrated and Renewed users were more likely to successfully tackle external barriers, because they overcame most of their internal barriers. For example, the three Mechanical users described that they managed the use of the innovation with varying degrees of efficiency, lacked the ability to predict immediate consequences, and the interactivity between the teachers and students was often disjointed in their schools. Conversely, the Integrated user described a school environment in which collaboration with other staff and teachers in the use of educational instructional technology and changes made in coordination with school staff and teachers was commonplace. Many sociocultural, environmental, and personal constraints like teacher attitudes, the complexity of technology, lack of knowledge, lack of growth mindset, and lack of training for teachers (see Petko et al., 2018) impede the implementation of the innovation by teachers. When teachers do not seem to have an authoritative voice, lack support or control over policy related to instruction compared to other educational stakeholders such as administrators (Petko et al., 2018) accessibility and confidence in the benefits of instructional technology for teachers waned. Because of the interference of the Covid-19 pandemic, most of the teacher participants successfully tackled their internal or personal barriers to successfully overcome school related or

external barriers to adopting and integrating educational instructional technology in District X schools albeit for now.

The finding associated with sub-research question RQ1b is, *the 10 participants' perceptions varied regarding administrative, institutional, and professional challenges for the use of educational instructional technology pertained to funding, technology availability, and choice of educational instructional technology*. The finding confirms one of the anticipated reference-based outcomes. Each participant's perception of the role schools played varied depending on the decision making and policies implemented by administrators regarding funding, the availability of technology, and choice of educational instructional technology per school in District X. The role schools played were perceived as beneficial or adverse depending on how school administrators had to restructure, reorganize, or reallocate the division of labor, school directives or rules, funds, and resources. External and internal barriers also strongly influence teachers' decision making regarding the adoption and integration of educational instructional technology. Acknowledging this activity in their own research, Dele-Ajayi et al. (2021) pointed out that the external barriers can include "those related to resources e. g. access to technology, technical and administrative support" and internal barriers include "those barriers related to teachers and their attitudes e. g. beliefs about classroom practices and routines, unwillingness to embrace change and beliefs about teaching and learning" (p. 3). Similarly, Sannino and Engeström (2018) concluded that when teachers and administrators were able to collaborate regarding funding, policies, and such, then the role schools played was perceived as beneficial.

The majority of the teacher participants perceived the role schools played in District X was beneficial excluding Participants #4, #8, #9, and #10. Participant #4 was a past user, so the participant could not provide perceptions from the 2020-2021 school year. Participant #8 did not perceive the role of school as beneficial because of "anxiety," "having a hard time," and a lack of school support. Both Participants #9 and #10 did not perceive the role of schools as beneficial because of a lack of funding, a lack of teacher and student technology knowledge and training, and a lack of technology resources. These four participants did not perceive the role of schools to be beneficial because of sociocultural challenges that were not resolved by the schools and this perception impacted the teachers as users (Mechanical and Routine). Regarding these perceptions, Dele-Ajayi et al. (2021) rationalized the "due to cultural, social, and individual differences, teachers across the world perceive technology differently and their use of technology in education is strongly determined by how they think and feel about it" (p. 3). Even though six of the participants considered the innovation to be beneficial, the other four did not based on their experiences and perceptions.

The other finding associated with sub-research question RQ1a is *Teachers value the innovation*. In relation to this study, the participants did not seem to grieve how they may or may not have used educational instructional technology in the past. Nine of the ten participants currently use and value the innovation, but there was minimal evidence that the innovation would be valued or used in the future. Al-Ali (2021) and Hofmann et al., (2021) recommended that concrete, adaptable, and flexible change and contingency planning will need to occur to increase the continued valuation of the use of educational

instructional technology in the classroom. Among all the participants, no such enabling community actions were described.

The current study has built upon the work of key contemporary researchers like Al-Ali (2021), Dele-Ajayi et al. (2021), Hofmann et al. (2021), and Matar (2017) with the outcome that the study has confirmed and extended knowledge in the discipline of education that those studies did not present. The findings of the study, described and identified in Chapter 4, confirmed the research of Al-Ali (2021) and Hofmann et al. (2021). While all the participants valued the innovation, they differed in their valuation, implementation, collaboration, and adaptation of educational instructional technology based on the unanticipated emergence of the Covid-19 pandemic and the challenges, shifts, and tensions that arose because of the pandemic. The participants' level of use or the adoption of the innovation depended on several factors, such as personal benefit, instructional or professional needs, and accessibility. The pandemic triggered changes in the rules and division of labor at District X schools as well as impacted collaboration, the instruction environment or setting, and teacher agency. During the pandemic, teacher collaboration occurred infrequently because of the abrupt altering of school policies, rules, and guidelines. Instruction shifted to virtual and social distancing was mandated. The findings of this study confirmed the concluding notions of Al-Ali (2021) and Hofmann et al. (2021), that encourage proactive, clear planning and adapted or new approaches of professional development for sustainable teacher development and learning in the event that similar future events arise. A recommendation is for schools or school districts to develop contingency plans for all school stakeholders (e.g., students,

teachers, staff, community partners) to be work together to determine and prepared for similar disruptive future events. It is important that school and District X administrators develop clear, scalable, contingency plans to sustain the levels of teacher adoption and integration of educational instructional technology caused by the pandemic and they need to continue to address the shifts caused by the Covid-19 or potential future disruptions. In addition, this study added support to claim of Al-Ali (2021) that more "research and discussion" of the reconfiguration of CHAT to add environment as an element of it theoretical design (p. 285). Environment was a major factor or consideration in this study as well and its relationship with the other elements of CHAT need further consideration.

The findings of this study confirmed the knowledge presented and added to the knowledge not presented by Matar (2017). In agreement with Cuban (2013, 2020), I have determined that most teachers face innovation as Mechanical and Routine users. This study confirmed that many CBAM LoU users, like Mechanical and Routine users, focus on daily, short term use of instructional technology. This study adds to Matar's argument that "many evaluation studies have researched the obstacles and challenges of using and adopting e-learning, and less has been oriented towards evaluating the current engagement, challenges and obstacles facing such engagement" (p. 152). This study evaluated the adoption and integration of educational instructional technology during a pandemic, while acknowledging the challenges and tensions that presented themselves during the event. The study can be considered an assessment of the current post pandemic issues pertaining to the adoption and integration of educational instructional technology.

The current study confirmed and extended the knowledge presented by Dele-Ajayi et al. (2021). Dele-Ajayi et al., claimed that "evidence from literature suggests that despite enormous investment in digital innovations for education globally, most of the technologies do not get adopted in the classroom" (p. 16). The findings from this generic qualitative study confirm that instructional technology is valued, because of the pandemic, the participants of this study did adopt the innovation. This study added to the claim Matar (2017) made "that teachers' concerns about adopting and integrating the technologies are often not identified and addressed" (p.16). This study identified and acknowledged the teacher participants' concerns and challenges regarding the adoption and integration of educational instructional technology in District X schools.

Limitations of the Study

There were two limitations of trustworthiness that affected this study. The first limitation was that it took an extended amount of time to receive approval to begin the study due to legal concerns between District X and Walden University. The entire study was intended to transpire within 3 months, not to exceed a year, to limit costs. Because of the extension of time, this study took an additional year to complete. The second limitation was the Covid-19 pandemic. District X shifted from in person instruction to virtual or distance learning or a hybrid version depending on the school. In addition, once approval to begin the study was given, principals and teachers were more concerned about resuming in-person instruction and finishing the school year. Participant recruitment and data collection were challenging because of the pandemic and the shifts in environment (in person to virtual then back to in person).

Recommendations

Based on the strengths and limitations of this study, there are some recommendations. This study transpired during a pandemic. First, I recommend that the study is replicated post pandemic to compare the findings and to determine if the positive effects of the pandemic will be sustained. In Chapter 2, I used the literature to show that even when the innovation is available and there are few or no challenges for teachers, they reacted much as Cuban (2013, 2020) described, tending to approach instruction traditionally or reverting to the status quo. It is important that the educational community continues to explore the factors that influence teachers' attitudes, perceptions, and behaviors toward the adoption or integration of educational instructional technology in classrooms.

A second recommendation is that school administrators of District X focus on professional training that might help users evolve toward becoming more Refined, Integrated, or Renewed users of instructional technology. Petko et al. (2018) and Popova and Fabre (2017) pointed out that teachers often do not adopt, integrate, or sustain using instructional technology, because of a lack of professional development and training. Some of the participants shared in Table 5 that they wanted to learn more about the different types of instructional technology. Focusing on training and professional development could increase the chances of teachers adopting the innovation.

I also recommend for further study an examination of the role of *environment* affecting an activity system such as CHAT. The environment, the time period, the cultural, personal, and social conditions of the time period, and the location or setting,

should be studied in association with the community, division of labor, and rules of the activity theory model instead of as an independent element that affected and framed the activity. The environment in addition to the elements of the CHAT model needs to be considered within the activity system, especially since the tensions that arose stemmed from the complex interconnection of the environment and the elements of CHAT. The addition of environment and the discussion and investigation of the impact of it as a new component of CHAT could enhance the coherence and relevance of the theory.

Implications

This study positively contributes to future research and social change because it focused on understanding how and why many urban public-school teachers have resisted integrating instructional technology despite access to instructional technology, training, and research data. Additionally, the results of this study contribute to positive social change by providing insight into individual public school teachers' influence on the adoption or integration of instructional technology during the Covid-19 pandemic. The study extends the knowledge about the influences that impact teachers' decision making pertaining to the adoption or integration of educational instructional technology that has been obtained during a major environmental disruption (pandemic) at the micro level (individual teacher), macro level (school system), and mega level (education community). Importantly, exploring the apparent discrepancy between pre- and post-pandemic literature regarding expected teacher actions related to innovation adoption, the study uncovered the necessity of anticipating the role of "environment" to better understand the potential for agency within an activity system.

Prepandemic, teachers' adoption or integration of the innovation was not embraced despite the research literature. Because of the abrupt emergence of the pandemic and the shifting instructional environment, the teachers' decision to adopt the innovation was positively impacted and shaped by the pandemic. Based on the findings, teachers adapted to the pandemic environment and the degree of adaptation depended on the participant's level of use or user status. This adaptation occurred because each school as well as District X played a part in defining and offering policies and technological resources allotted to the activity for teachers. The environment and role of schools differed for each study participant. Thus, nine of the participants were actively using the innovation, but because of the differences in environment and the roles of the individual schools, the majority were identified as Mechanical and Routine users who used educational instructional technology in isolation and who relied on prepandemic knowledge, skills, and capacity to teach. The modifications made by the teacher participants during the pandemic environment are evident in their user status and their perceptions of the innovation. The different components of the activity: the teachers' role in the school, the types of instructional technology used to integrate, and the degree of evaluation of use were motivated by the tensions derived from the pandemic environment. The nine participants adaptation to the pandemic environment resulted from their actively responding to the abrupt change to the prepandemic activity environment. What is not discernable is whether the pandemic inspired adaptation will be sustained post pandemic. The findings of this study support the need for District X and its schools'

administrators to craft contingency plans that would assist in sustaining teachers' implementation of the innovation.

The findings of the study dictate the necessity for more awareness of the impact and role of environment of the activity theory. Using CHAT as an element of the theoretical framework allowed for the description and understanding of how the interconnection of the teachers, District X, the individual schools in which they instruct, and the environment or setting affected the participants' adoption or integration and level of use of the innovation (see Figure 1). The environment or setting was the time during the Covid-19 pandemic, which affected the teachers, who are a part of both the District X and their individual school systems, actions. When I referred to Figure 1, the visualization of CHAT, the pandemic and the challenges and tensions associated with it, could not be easily aligned with the components of the theoretical model. The activity, the adoption or integration of educational instructional technology, stemmed from the pandemic environment, but environment is not clearly identified as a component within the activity system (see Figure 1). CHAT is flexible enough to study the interconnections and complex relationships between teachers, the school and District X communities, instructional technology, and its usage in the classroom, but it does not clearly explain how the instructional environment (cultural, physical, virtual, and social) is essential to teachers' decision making and actions within the activity system. CBAM's LoU tool, the data collected from using it, and data analysis helped to align and fill in the gaps created by the tensions derived from the pandemic in the CHAT configuration (see Figure 1). The pandemic impacted and influenced how and why the learning environment (in person

or virtual), rules set by District X and school administrators, the social and cultural influences, and the division of labor or instructional roles within the school and District X communities contributed to the adoption or integration of educational instructional technology. While a pandemic is not positive, its effect on teachers in District X has been a positive social change. This study contributes to the findings of other research like Al-Ali (2021), who encouraged further study and a revisualization of the CHAT model to make the environment an active and more integrated component.

Conclusion

The outcome of this qualitative study provided District X and its stakeholders with evidence-based data and findings to help inform future decision making and integration of educational instructional technology. The problem was that many public-school teachers, despite access to instructional technology and research data, were reluctant to integrate instructional technology in their respective classrooms. Historically, a preponderance of teachers was perceived not to integrate technology into instruction in the classroom, even if it was available.

Many factors influenced teachers' adoption and integration of educational instructional technology including their beliefs, depth of technological knowledge, confidence, training, experience, institutional priorities, administrative policies, and funding. During this study, teachers were required by a substantial change to the instructional environment to use educational instructional technology, but their levels of use, integration, and perceptions still varied. While teachers do desire to implement a given innovation, it is unclear if they would adapt and evolve to a user status that would

be more accepting of collaboration and the adoption of educational instructional technology post pandemic, even though students enjoy or prefer technology usage in the classroom, and technology has been demonstrated to contribute positively to student achievement. The desire would be for teachers to continue to use and integrate educational instructional technology to diminish the achievement gap, improve the learning environment with increased student engagement and motivation, and teachers benefitting professionally.

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Appendix A: CBAM Stages of Concern Questionnaire

Name (optional): _____

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, **many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time.** For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0	1	2	3	4	5	6	(7)
This statement is somewhat true of me now.	0	1	2	3	(4)	5	6	7
This statement is not at all true of me at this time.	0	(1)	2	3	4	5	6	7
This statement seems irrelevant to me.	(0)	1	2	3	4	5	6	7

Please respond to the items in terms of **your present concerns,** or how you feel about your involvement with **this** innovation. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

Thank you for taking time to complete this task.

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

	Circle One Number For Each Item
1. I am concerned about students' attitudes toward the innovation.	0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
3. I am more concerned about another innovation.	0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the innovation.	0 1 2 3 4 5 6 7
6. I have a very limited knowledge of the innovation.	0 1 2 3 4 5 6 7
7. I would like to know the effect of reorganization on my professional status.	0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the innovation.	0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0 1 2 3 4 5 6 7
11. I am concerned about how the innovation affects students.	0 1 2 3 4 5 6 7
12. I am not concerned about the innovation at this time.	0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the new system.	0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the innovation.	0 1 2 3 4 5 6 7
15. I would like to know what resources are available if we decide to adopt the innovation	0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all that the innovation requires.	0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration is supposed to change.	0 1 2 3 4 5 6 7
18. I would like to familiarize other departments or persons with the progress of this new approach.	0 1 2 3 4 5 6 7

19. I am concerned about evaluating my impact on students.	0 1 2 3 4 5 6 7
20. I would like to revise the innovation's approach.	0 1 2 3 4 5 6 7
21. I am preoccupied with things other than the innovation.	0 1 2 3 4 5 6 7
22. I would like to modify our use of the innovation based on the experiences of our students.	0 1 2 3 4 5 6 7
23. I spend little time thinking about the innovation.	0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in this approach.	0 1 2 3 4 5 6 7
25. I am concerned about time spent working with nonacademic problems related to the innovation.	0 1 2 3 4 5 6 7
26. I would like to know what the use of the innovation will require in the immediate future.	0 1 2 3 4 5 6 7
27. I would like to coordinate my efforts with others to maximize the innovation's effects.	0 1 2 3 4 5 6 7
28. I would like to have more information on time and energy commitments required by the innovation.	0 1 2 3 4 5 6 7
29. I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7
30. Currently, other priorities prevent me from focusing my attention on the innovation.	0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the innovation.	0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7
33. I would like to know how my role will change when I am using the innovation.	0 1 2 3 4 5 6 7
34. Coordination of tasks and people is taking too much of my time.	0 1 2 3 4 5 6 7
35. I would like to know how the innovation is better than what we have now.	0 1 2 3 4 5 6 7

Please complete the following:

1. How long have you been involved with the innovation, not counting this year?
   Never ___ 1 year ___ 2 years ___ 3 years ___ 4 years ___ 5 or more ____

2. In your use of the innovation, do you consider yourself to be a:
   non-user ___ novice ___ intermediate ___ old hand ___ past user ____

3. Have you received formal training regarding the innovation (workshops, courses)?
   Yes ____ No ____

4. Are you currently in the first or second year of use of some major innovation or program other than this one?
   Yes ____ No ____

   If yes, please describe briefly:

   _____

   _____

   _____

Thank you for your help!

Appendix B : Levels of Use Interview Protocol and Innovation Chart

Site: _____ Interview ID: _____

Interviewer: _____ Rater: _____

Innovation: [innovation description].

NONUSER – Interviewer Questions

- Interviewee demographic questions (examples)*: What grade or content area do you teach? How long have you been teaching at [school]? How long have you been in the profession of teaching?*
- Are you currently using _____? **NO**
- Have you ever used it in the past? If so, when? Why did you stop?

If yes (a past user), continue…

- Can you describe for me how you organized your use of _____, what problems you found and what its effect appeared to be on students?
- When you assess _____ at this point in time, what do you see as the strengths and weaknesses?

If no, or finished with past user questions, continue…

O/I-II

- Have you made a decision to use _____ in the future?

I/II

- If so, when will you begin use?

Knowledge

- Can you describe _____ for me as you see it?

Acquiring Information

- Are you currently looking for any information about _____? What kinds? For what purposes?

Knowledge

- What do you see as the strengths and weaknesses of _____ in your situation?

Assessing

- At this point in time, what kinds of questions are you asking about _____?
  Give examples if necessary.

Sharing

- Do you ever talk with others and share information about _____? What do you share?

Planning

- What are you planning with respect to _____?
- Can you tell me about any preparation or plans you have been making for the use of _____?

Final Question (Optional)

- Can you summarize for me where you see yourself right now in relation to the use of _____?

Site: _____Interview ID: _____
Interviewer: _____Rater: _____

Innovation: [innovation description]

USER – Interviewer Questions

- Optional Interviewee Demographic questions: *What grade or content area do you teach? How long have you been teaching at [school]? How long have you been in the profession of teaching?*
- Are you currently using _____? **YES**
- Please describe for me how you use _____. (Ask questions to cover minimal criteria for use.)

Assessing/Knowledge

- What do you see as the strengths and weaknesses of _____ in your situation?
- Have you made any attempt to do anything about weaknesses? (Probe any mentioned specifically.)

Acquiring Information

- Are you *currently* looking for any information about _____? What kinds? For what purposes?

LoU V

- Do you work with others in your use of _____? Do you meet on a regular basis?
- Have you made any changes in your use of _____ based on this coordination?

If yes, ask the following LoU V Probes

- Please describe for me how you work together. (What things do you share with each other?)
- What do you see as the effects of this collaboration?
- Are you looking for any particular kind of information in relation to this collaboration?
- Do you talk with others *about your collaboration*? If so, what do you share with them?
- Have you done any formal or informal evaluation of how your collaboration is working?
- What plans do you have for this effort in the future?

If you do not think the person is LoU V ask the following…

Sharing

- Do you ever talk with others about _____? What do you tell them?

Assessing

- Have you considered any alternatives or different ways of doing things with _____?
- Are you doing any evaluating, either formally or informally that would affect your use of _____?
- Have you received any feedback from students that would affect your use of _____?
- What have you done with the information you got?

Planning/Status

- As you look ahead to later this year, what plans do you have in relation to your use of _____?

III/IVA/IVB

- Have you made any changes recently in how you use _____? What? Why? How recently?
- Are you considering making any changes?

Continue with III-VI

- Are you considering or planning to make *major* modifications or *replace* _____ at this time?

Final Question

- Can you summarize for me where you see yourself right now in relation to the use of _____?
- Is there anything else would you like to say about _____ that I have not asked about?

SCALE POINT Definitions of the Levels of Use of the Innovation	CATEGORIES		
Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors but is limited by a set of identifiable Decision Points. For descriptive purposes, each level is defined by seven categories.	**KNOWLEDGE**	**ACQUIRING INFORMATION**	**SHARING**
	That which the user knows about characteristics of the innovation, how to use it, and consequences of its use. This is cognitive knowledge related to using the innovation, not feelings or attitudes.	Solicits information about the innovation in a variety of ways, including questioning resource persons, corresponding with resource agencies, reviewing printed materials, and making visits.	Discusses the innovation with others. Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.
LEVEL 0 NONUSE: State in which the user has little or no knowledge of the innovation, has no involvement with the innovation, and is doing nothing toward becoming involved.	Knows nothing about this or similar innovations or has only very limited general knowledge of efforts to develop innovations in the area.	Takes little or no action to solicit information beyond reviewing descriptive information about this or similar innovations when it happens to come to personal attention.	Is not communicating with others about the innovation beyond possibly acknowledging that the innovation exists.
DECISION POINT A	Takes action to learn more detailed information about the innovation.		
LEVEL I ORIENTATION: State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon the user and the user system.	Knows general information about the innovation such as origin, characteristics, and implementation requirements.	Seeks descriptive material about the innovation. Seeks opinions and knowledge of others through discussions, visits, or workshops.	Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.
DECISION POINT B	Makes a decision to use the innovation by establishing a time to begin.		
LEVEL II PREPARATION: State in which the user is preparing for first use of the innovation	Knows logistical requirements, necessary resources and timing for initial use of the innovation, and details of initial experiences for clients.	Seeks information and resources specifically related to preparation for use of the innovation in own setting.	Discusses resources needed for initial use of the innovation. Joins others in pre-use training, and in planning for resources, logistics, schedules, etc., in preparation for first use.
DECISION POINT C	Changes, if any, and use are dominated by user needs. Clients may be valued; however, management, time, or limited experimental knowledge dictate what the user does.		
LEVEL III MECHANICAL USE: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.	Knows on a day-to-day basis the requirements for using the innovation. Is more knowledgeable on short-term activities and effects than long-range activities and effects of use of the innovation.	Solicits management information about such things as logistics, scheduling techniques, and ideas for reducing amount of time and work required of user.	Discusses management and logistical issues related to use of the innovation. Resources and materials are shared for purposes of reducing management, flow, and logistical problems related to use of the innovation.
DECISION POINT D-1	A routine pattern of use is established. Changes for clients may be made routinely, but there are no recent changes outside the pattern.		
LEVEL IVA ROUTINE: Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.	Knows both short- and long-term requirements for use and how to use the innovation with minimum effort or stress.	Makes no special effort to seek information as a part of ongoing use of the innovation.	Describes current use of the innovation with little or no reference to ways of changing use.
DECISION POINT D-2	Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes. The changes must be recent.		
LEVEL IVB REFINEMENT: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients.	Knows cognitive and affective effects of the innovation on clients and ways for increasing impact on clients.	Solicits information and materials that focus specifically on changing use of the innovation to affect client outcomes.	Discusses own methods of modifying use of the innovation to change client outcomes.
DECISION POINT E	Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.		
LEVEL V INTEGRATION: State in which the user is combining own efforts to use the innovation with the related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.	Knows how to coordinate own use of the innovation with colleagues to provide a collective impact on clients.	Solicits information and opinions for the purpose of collaborating with others in use of the innovation.	Discusses efforts to increase client impact through collaboration with others on personal use of the innovation.
DECISION POINT F	Begins exploring alternatives or major modifications to the innovation presently in use.		
LEVEL VI RENEWAL: State in which the user reevaluates the quality of use of the innovation, seeks major modifications or alternatives to the present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.	Knows of alternatives that could be used to change or replace the present innovation that would improve the quality of outcomes of its use.	Seeks information and materials about other innovations as alternatives to the present innovation or for making major adaptations in the innovation.	Focuses discussions on identification of major alternatives to or replacements for the current innovation.

CATEGORIES			
ASSESSING	**PLANNING**	**STATUS REPORTING**	**PERFORMING**
Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.	Designs and outlines short- and/or long-range steps to be taken during process of innovation adoption, i.e., aligns resources, schedules, and activities, and meets with others to organize and/or coordinate use of the innovation.	Describes personal stand at the present time in relation to use of the innovation.	Carries out the actions and activities entailed in operationalizing the innovation.
Takes no action to analyze the innovation, its characteristics, possible use, or consequences of use.	Schedules no time and specifies no steps for the study or use of the innovation.	Reports little or no personal involvement with the innovation.	Takes no discernible action toward learning about or using the innovation. The innovation and/or its accoutrements are not present or in use.
Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths, and weaknesses for purpose of making a decision about use of the innovation.	Plans to gather necessary information and resources as needed to make a decision for or against use of the innovation.	Reports presently orienting self to what the innovation is and is not.	Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it.
Analyzes detailed requirements and available resources for initial use of the innovation.	Identifies steps and procedures entailed in obtaining resources and organizing activities and events for initial use of the innovation.	Reports preparing self for initial use of the innovation.	Studies reference materials in depth, organizes resources and logistics, and schedules and receives skill training in preparation for initial use.
Examines own use of the innovation with respect to problems of logistics, management, time, schedules, resources, and general reactions of clients.	Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Planned-for changes address managerial or logistical issues with a short-term perspective.	Reports that logistics, time, management, resource organization, etc., are the focus of most personal efforts to use the innovation.	Manages the innovation with varying degrees of efficiency. Often lacks anticipation of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven, and uncertain. When changes are made, they are primarily in response to logistical and organizational problems.
Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use.	Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc.	Reports that personal use of the innovation is going along satisfactorily with few if any problems.	Uses the innovation smoothly with minimal management problems; over time there is little variation in pattern of use.
Assesses use of the innovation for the purpose of changing current practices to improve client outcomes.	Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes.	Reports varying use of the innovation in order to change client outcomes.	Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes.
Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrated effort.	Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients.	Reports spending time and energy collaborating with others about integrating own use of the innovation.	Collaborates with others in use of the innovation as a means for expanding the innovation's impact on clients. Changes in use are made in coordination with others.
Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.	Plans activities that involve pursuit of alternatives to enhance or replace the innovation.	Reports considering major modifications or alternatives to present use of the innovation.	Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.

Appendix C: Cover Letter to Participants

Dear _____

Hello, my name is Aletcia Whren, and I am a doctoral candidate at Walden University. I am pursuing my dissertation topic, and the purpose of the study is to explore individual public-school teachers' influence on technology implementation at multiple District of Columbia public schools. Your participation is desired because you are a public-school teacher.

Participating in this qualitative study involves approximately two hours of your time. The Stages of Concern Questionnaire could take up to 45 minutes to complete online. The interviews with your consent will be recorded using Microsoft Teams or Zoom and transcribed and take up to an hour and 45 minutes. To maintain confidentiality, you will not be identified by name in the recording. I will transcribe the audio and video recordings. The recordings and any relevant artifacts and documents will be stored on my laptop and an external hard drive in my home. Each participant will be offered a copy of the recording and the transcription. The recordings and transcriptions from the case study will be destroyed 5 years after the publication of the dissertation.

You must know that your name, your school, and any other information gathered in this study will remain confidential and will only be used for educational purposes.

Thank you for your thoughtful consideration of my participation request. I look forward to your participation in the case study.

Sincerely,

Aletcia Whren

Appendix D: Stages of Concern Quick Scoring Device

The Quick Scoring Device can be used to hand score the Stages of Concern Questionnaire (SoCQ) responses and to plot an individual profile. It is especially useful when only a small number of questionnaires need to be processed or when computer processing is not available. By following the step-by-step instructions, the SoCQ responses are transferred to the device, entered into seven scales, and each scale is totaled. Then the seven raw scale score totals are translated into percentile scores and plotted on a grid to produce the individual's SoCQ profile.

Instructions

1. In the box labeled A, fill in the identifying information taken from the cover sheet of the SoCQ.
2. In the table labeled B on the Scoring Device, transcribe each of the 35 SoCQ circled responses from the questionnaire (raw data). Note that the numbered blanks are not in consecutive order.
3. Row C contains the Raw Scale Score Total for each stage (0–6). Take each of the seven columns (0–6) in Table B, add the numbers within each column, and enter the sum of each column (0–6) in the appropriate blank in Row C. Each of these seven Raw Scale Score totals is a number between 0 and 35.
4. Table D contains the percentile scores for each Stage of Concern. For example, find the Raw Scale Score Total for Stage 0 from Row C ("12" from the example) in the left-hand column in Table D, then look in the Stage 0 column to the right in Table D and circle that percentile rank ("69" in the example). Take the raw score for Stage 1 ("31" in the example) to Table D and locate that numeral in the left hand Raw Score Total column. Move across in the percentile table to the Stage 1 column and circle the percentile value ("98" in the example). Do the same for Stages 2 through 6.
5. Transcribe the circled percentile scores for each stage (0-6) from Table D to Box E. Box E now contains seven numbers between 0 and 99.
6. Box F contains the SoCQ grid. From Box E, take the percentile score for Stage 0 ("69" in the example) and mark that point with a dot on the Stage 0 vertical line of the SoCQ grid. Do the same for Stages 1–6. Connect the points to form the SoCQ profile.

You can now check your own scoring by using the blank profile sheet (see Appendix C). You will want to make copies of the blank scoring device before writing on it. Reproduce the data in the example by recording the original data from the completed SoCQ.

Stages of Concern Quick Scoring Device

A

Date: _____

Site: _____ SS#: _____

Innovation: _____

B

Stage	0	1	2	3	4	5	6
	3 ___	6 ___	7 ___	4 ___	1 ___	5 ___	2 ___
	12 ___	14 ___	13 ___	8 ___	11 ___	10 ___	9 ___
	21 ___	15 ___	17 ___	16 ___	19 ___	18 ___	20 ___
	23 ___	26 ___	28 ___	25 ___	24 ___	27 ___	22 ___
	30 ___	35 ___	33 ___	34 ___	32 ___	29 ___	31 ___

C Raw Score Totals

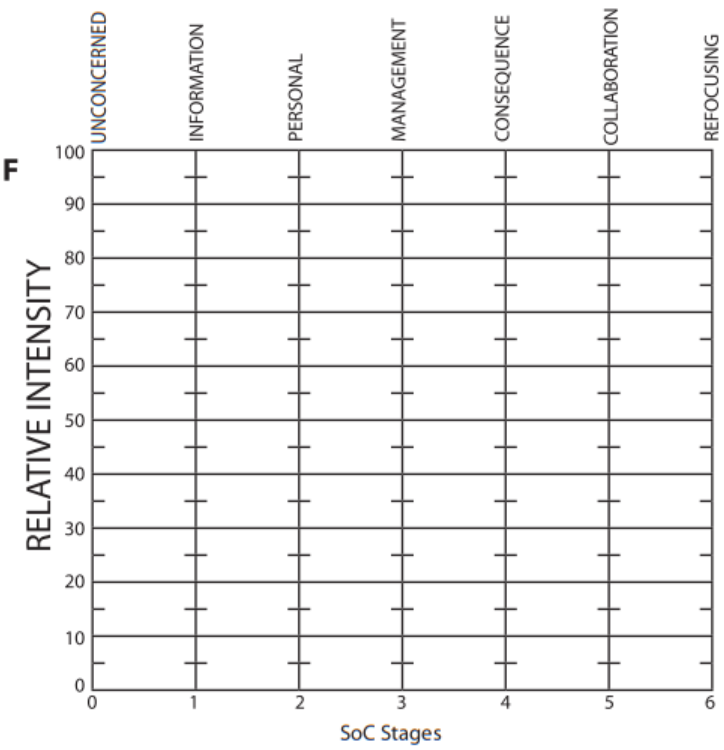
E Percentile Scores

D

Five Item Raw Scale Score Total	Percentiles for:						
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
0	0	5	5	2	1	1	1
1	1	12	12	5	1	2	2
2	2	16	14	7	1	3	3
3	4	19	17	9	2	3	5
4	7	23	21	11	2	4	6
5	14	27	25	15	3	5	9
6	22	30	28	18	3	7	11
7	31	34	31	23	4	9	14
8	40	37	35	27	5	10	17
9	48	40	39	30	5	12	20
10	55	43	41	34	7	14	22
11	61	45	45	39	8	16	26
12	69	48	48	43	9	19	30
13	75	51	52	47	11	22	34
14	81	54	55	52	13	25	38
15	87	57	57	56	16	28	42
16	91	60	59	60	19	31	47
17	94	63	63	65	21	36	52
18	96	66	67	69	24	40	57
19	97	69	70	73	27	44	60
20	98	72	72	77	30	48	65
21	99	75	76	80	33	52	69
22	99	80	78	83	38	55	73
23	99	84	80	85	43	59	77
24	99	88	83	88	48	64	81
25	99	90	85	90	54	68	84
26	99	91	87	92	59	72	87
27	99	93	89	94	63	76	90
28	99	95	91	95	66	80	92
29	99	96	92	97	71	84	94
30	99	97	94	97	76	88	96
31	99	98	95	98	82	91	97
32	99	99	96	98	86	93	98
33	99	99	96	99	90	95	99
34	99	99	97	99	92	97	99
35	99	99	99	99	96	98	99

Concerns Based Systems International

F



Appendix E: The LoU Rating Sheet

The LoU Rating Sheet

LEVEL OF USE RATING SHEET (CBAM, 1975)

Tape #: Site: Interviewer:

Date: / / I.D.#: Rater:

Level	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
Nonuse	0	0	0	0	0	0	0	0
Decision Point A								
Orientation	I	I	I	I	I	I	I	I
Decision Point B								
Preparation	II	II	II	II	II	II	II	II
Decision Point C								
Mechanical Use	III	III	III	III	III	III	III	III
Decision Point D-1								
Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2								
Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E								
Integration	V	V	V	V	V	V	V	V
Decision Point F								
Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing:	ND	ND	ND	ND	ND	ND	ND	
No information in interview:	NI	NI	NI	NI	NI	NI	NI	

Is the individual a past user? Yes No If so, what was their last LoU? _____

How much difficulty did you have in assigning this person to a specific LoU? None 1 2 3 4 5 6 7 Very much

Comments about interviewer—

General comments—

Appendix F: Codes Table

Table F1

Codes

Code Type	Initial Codes
CBAM	use(s), collaborate, seek(s), prepare, decide, and organize. Potentially, initial categories will be knowledge, acquiring information, sharing, assessing, planning, status reporting, and performing
CHAT	are subject, tools, object, community, subject-object, subject-tool, and subject-rules

Appendix G: Member Check Form

Date: _____

Dear _____

Thank you for volunteering and participating in this generic study, the observation, and interview. Attached please find a draft copy of the transcripts for your review. Please check for accuracy and that your responses are being reported correctly. Please feel free to contact me should you have any questions.

By your act of receiving, reading, and reviewing the transcript(s), if I do not hear from you or receive an email from you within five business days, I will assume you agree with the transcript(s).

Sincerely,

Aletcia Whren

Appendix H: Stages of Concern Questionnaire (SoCQ) Participant Letter

Dear colleague,

Thank you so much for your interest. My name is Aletcia Whren, and I am a DCPS teacher and a doctoral candidate at Walden University researching individual public-school teacher influence on classroom instructional technology implementation. DCPS has approved my research proposal.

You are invited to participate in a questionnaire related to THE INNOVATION, Instructional technology. According to Findlay-Thompson et al. (2015), instructional technologies are tools or resources used in the classroom to aid with assessments, instruction, and teaching. According to Bozkurt et al. (2014), instructional technology is the combination of theory and practice with the goal of learning during the stages of design, development, practice, and evaluation and includes learning-teaching settings, pedagogical studies and services management, library services, means of communication, and the teaching of technology. Some of these items include SMART Boards™, PowerPoints®, other presentation platforms and software, electronic collaboration platforms, handheld devices like clickers, and online evaluation tools.

The purpose of the questionnaire is to determine what people are concerned about at various times during the process of adopting an innovation. The survey is called the Stages of Concern Questionnaire, and it will take approximately 5-10 minutes to complete.

The survey is available online at: https://sedl.org/concerns/index.cgi?sc=ay6fxg

Enter the password: **ay6fxg** to log on if need be.

I am seeking at least 8-12 participants to be interviewed and you will only be invited to interview depending on your questionnaire score. The interviews, with your consent, will be conducted using Microsoft Teams or Zoom and take about 20 minutes to complete. There will be no video recordings. Only the audio of the interview recorded; this can take up to 20 minutes.

To maintain confidentiality in the data collected, the recordings and their transcriptions will be stored on a secure external hard drive in my home. Each participant will also be invited to participate in an approximately 30-minute session to verify the interview data and a short debrief session to review the final results. The transcriptions from the study will be destroyed five years after the publication of the dissertation.

If you have additional questions or need assistance, please email me at

Appendix I: CBAM LoU Training Certification Letter

July 22, 2021

Dear Aletcia:

Congratulations! We are pleased to report that you have successfully completed the Levels of Use Interviewer Certification Process. You have:

1) Completed the three-day LoU Training
2) Demonstrated reliability in rating data related to each Category and Decision Point
3) Demonstrated understanding about the holistic approach to determining the Overall LoU
4) Demonstrated consistency in using all of the questions in the LoU Interview Protocol
5) Demonstrated the ability to construct follow up probing questions related to each Category and Decision Point, And
6) Demonstrated the ability to holistically determine the Overall LoU rating of your interviews.

We wish you great success in your conducting LoU Interviews and applying the LoU construct in your future endeavors.

Please feel free to contact us when you have questions. Also, we will be interested in learning about your uses of LoU, especially study findings and any ah ha's. Sincerely yours,

Gene E. Hall, Ph.D.

Gene E. Hall, PhD, Research Professor UCD, Professor Emeritus UNLV

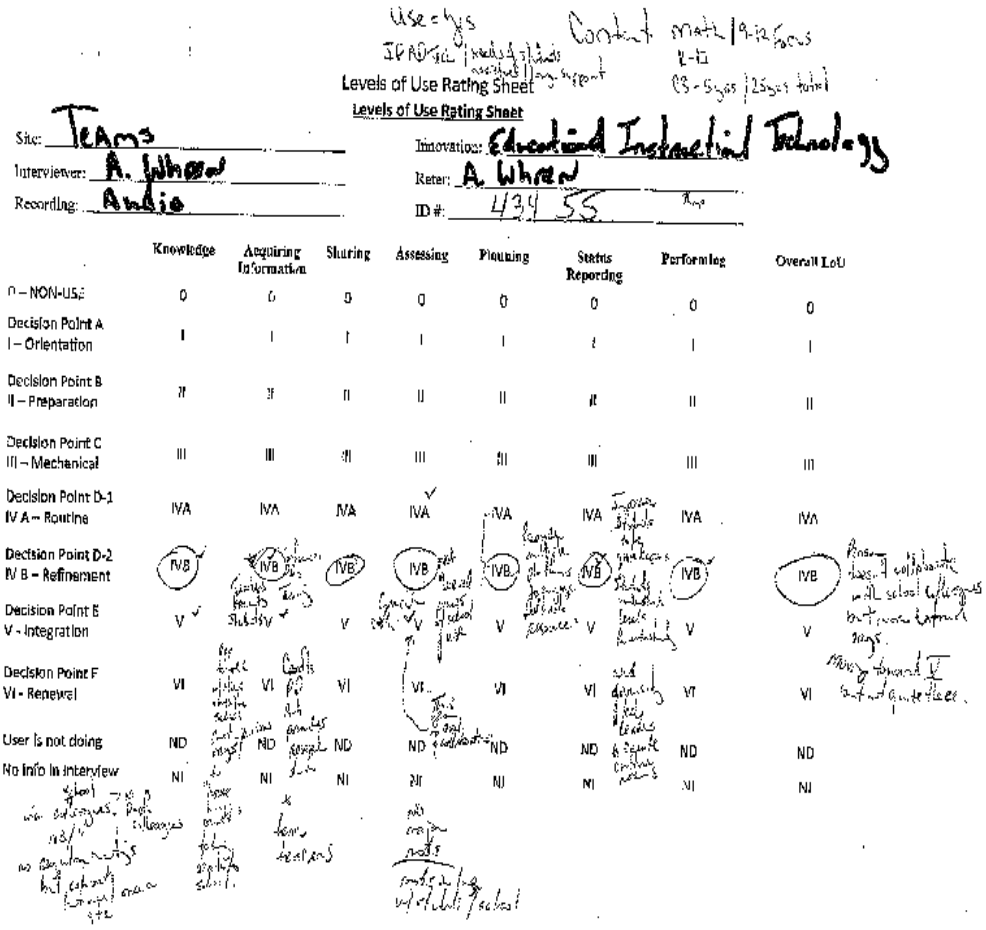
Julie Oxenford O'Brian

Julie Oxenford-O'Brian, PhD, Co-Director, Center for Practice Engaged Education Research (C-PEER)

Kent Seidel

Kent Seidel, PhD, Founding Co-Director, Center for Practice Engaged Education Research (C-PEER)

Appendix J: Participant LoU Rating Sheets



Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: TEAMS

Innovation: Educational Instructional Technology

Interviewer: A. Wheat

Reter: A. Wheat

Recording: Audio

ID #: 434 55

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: DCPS

Innovation: Educational Instructional Technology

Interviewer: A. Wren

Rater: A. Wren

Recording: Audio

ID #: 43452 Johnson

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: Teams

Interviewer: A. Whren

Recording: Audio

Innovation: Educational Instructional Technology

Rater: A. Whren

ID #: 43458

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No Info in interview	NI	NI	NI	NI	NI	NI	NI	NI

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Innovation: Educational Instructional Technology

Interviewer: A. Wheeler

Rater: A. Wheeler

Recording: Audio

ID #: 43459

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V – Integration	V	V	V	V	V	V	V	V
Decision Point F VI – Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

not looking actively about using use next year.
Wrapping up school year 2020-2021.

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: DCPS

Interviewer: [illegible]

Recording: [illegible]

Innovation: Ed-Tech. Tech

Rater: [illegible]

ID #: 43460

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
~~0—NON-USE~~	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

G 6-8 PE/Health
[illegible]

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: Teams

Interviewer: A. Wharton

Recording: Audio

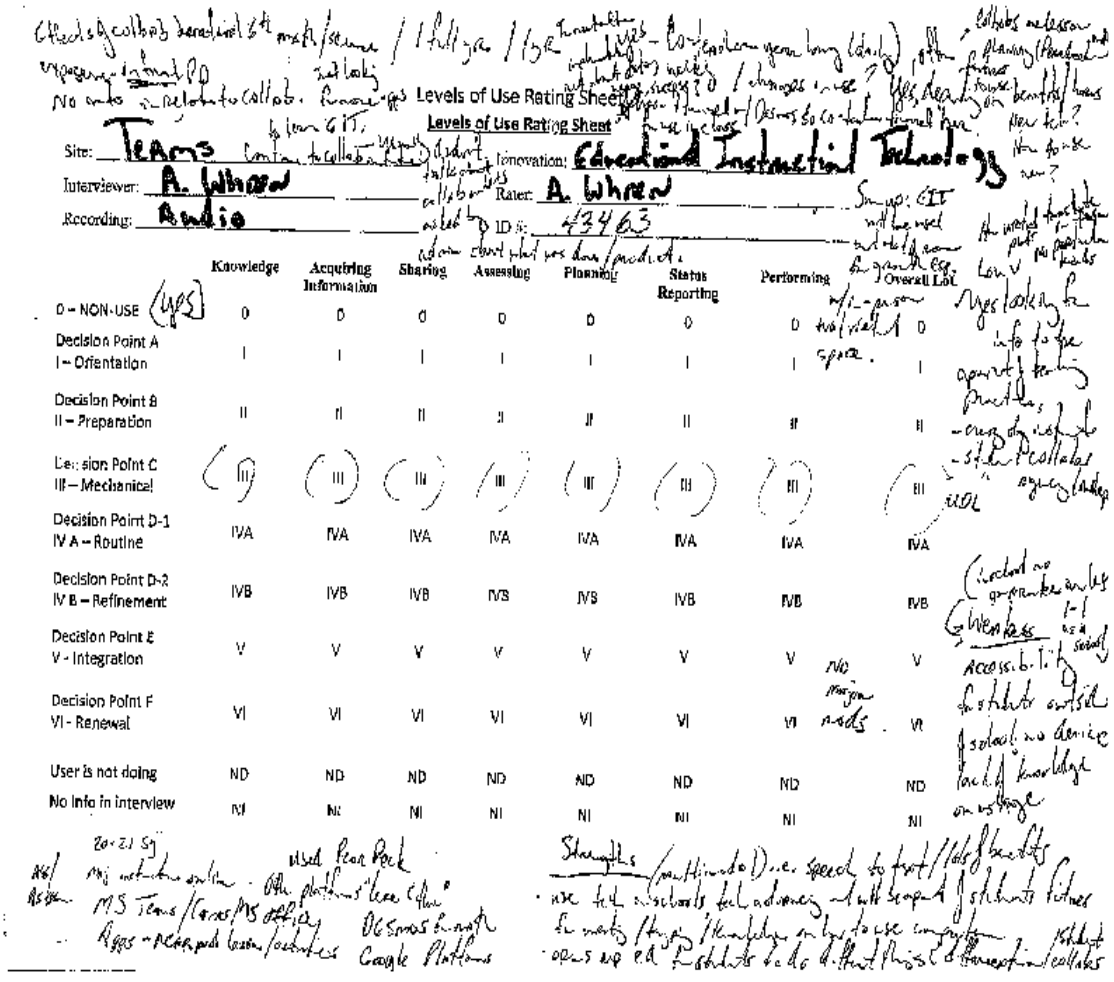
Innovation: Educational Instructional Technology

Rater: A. Wharton

ID #: 43461

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	(VI)	(VI)	(VI)	(VI)	(VI)	(VI)	(VI)	(VI)
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

[illegible]



Levels of Use Rating Sheet

Site: Teams

Interviewer: A. Wheat

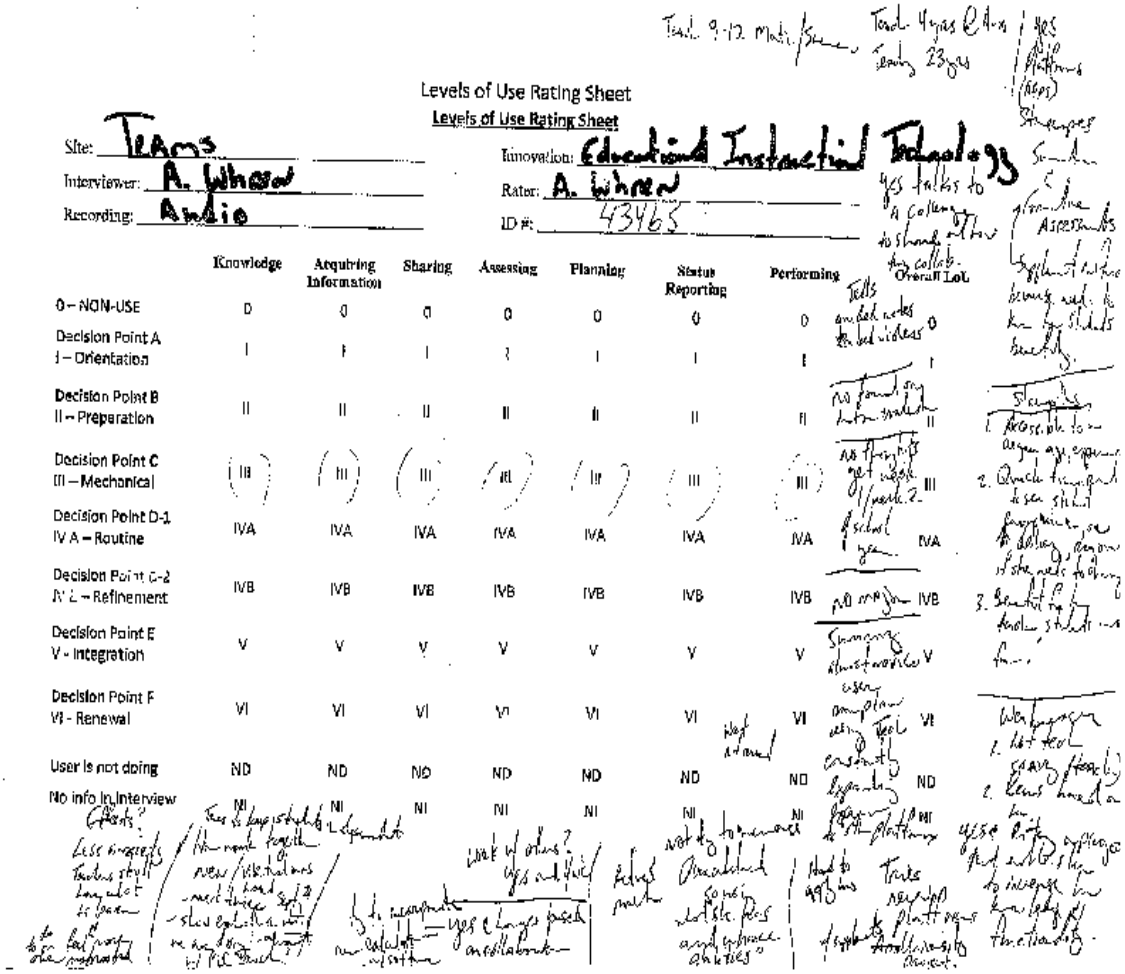
Recording: Audio

Innovation: Educational Instructional Technology

Rater: A. Wheat

ID #: 43463

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE (UPS)	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI



Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: TEAMS

Interviewer: A. Wilson

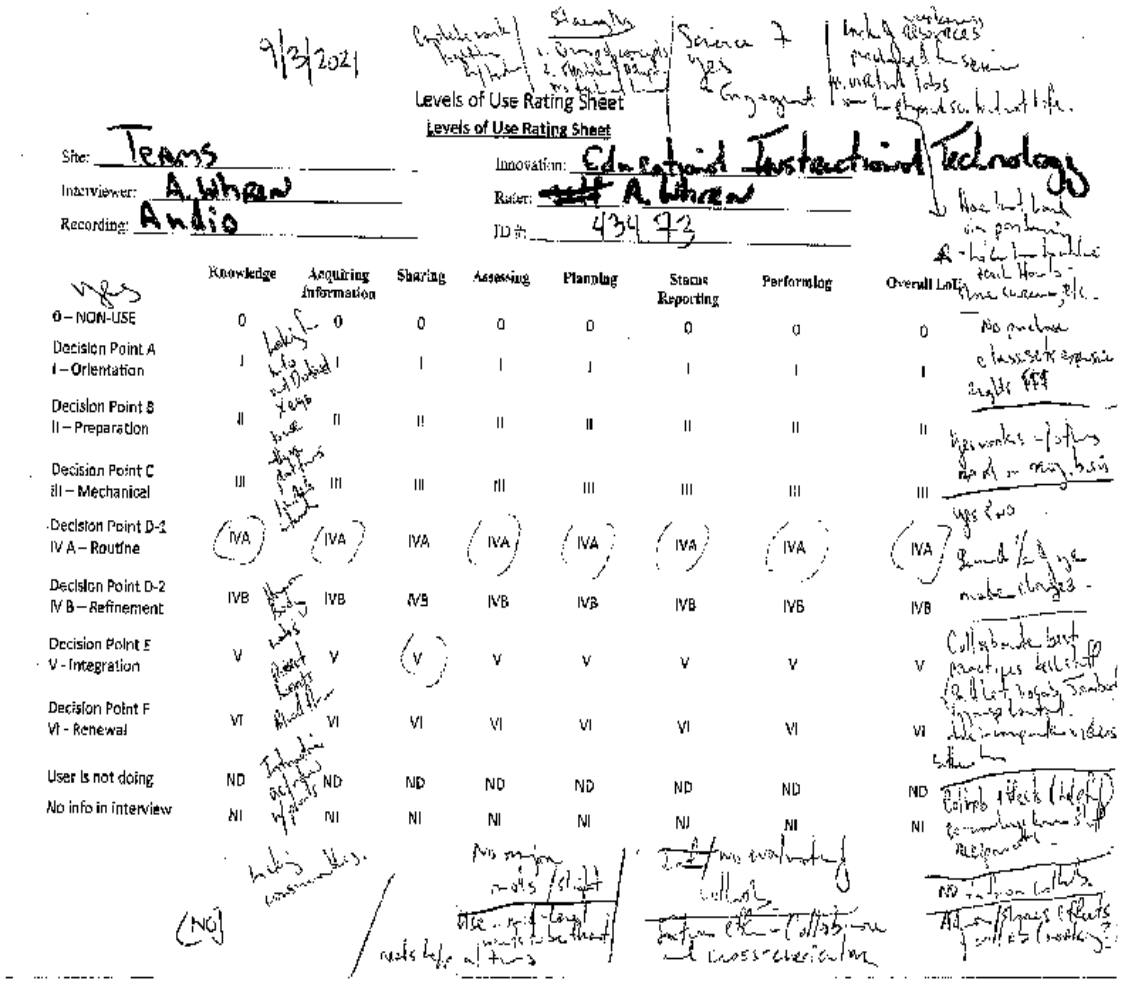
Recording: Audio

Innovation: Educational Instructional Technology

Rater: A. Wilson

ID #: 43465

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI



9/3/2021

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: Teams

Interviewer: A. Whaw

Recording: Audio

Innovation: Educational Instructional Technology

Rater: A. Whaw

ID #: 434 73

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

Levels of Use Rating Sheet

Levels of Use Rating Sheet

Site: Teams

Interviewer: A. Wheeler

Recording: Audio

Innovation: Educational Instructional Technology

Rater: A. Wheeler

ID #: 43495

	Knowledge	Acquiring Information	Sharing	Assessing	Planning	Status Reporting	Performing	Overall LoU
0 – NON-USE	0	0	0	0	0	0	0	0
Decision Point A I – Orientation	I	I	I	I	I	I	I	I
Decision Point B II – Preparation	II	II	II	II	II	II	II	II
Decision Point C III – Mechanical	III	III	III	III	III	III	III	III
Decision Point D-1 IV A – Routine	IVA	IVA	IVA	IVA	IVA	IVA	IVA	IVA
Decision Point D-2 IV B – Refinement	IVB	IVB	IVB	IVB	IVB	IVB	IVB	IVB
Decision Point E V - Integration	V	V	V	V	V	V	V	V
Decision Point F VI - Renewal	VI	VI	VI	VI	VI	VI	VI	VI
User is not doing	ND	ND	ND	ND	ND	ND	ND	ND
No info in interview	NI	NI	NI	NI	NI	NI	NI	NI

(No changes)

Appendix K: Excerpt from Audit Log

In addition, to the interview notes that can be found on the ratings sheets (see Appendix J) for the ten participants, other field notes were taken. See below.

Participant #	**Additional Notes: Wonderings and Connections**
1	6.21 Why does the teacher prefer to share information with colleagues or outside school but does not collaborate in the school. Seems experienced with the innovation, and wants to learn more, but not looking to make major changes, only wants to refine use. Seems to use similar words and terms as participant #4. Both same gender and seem to want to transition out of the classroom.
2	6.21 Teacher collaborates with core and exploratory teachers and seems to enjoy collaborating, but experience with innovation is strong when it comes to specialization. The teacher seems to want to learn more about the innovation and continue to share for the students and teachers. Used some terms similar to participant #6, but different number of years teaching and gender. Seems to prefer alternative methods of instruction.
3	6.21 Teacher is a veteran and wants to learn more about innovation or instruction but does not make many changes in use. Similar words and terms used as participants #5 and #10. Open to alternative methods of instruction but incorporating them.
4	7.21 Initially spoke of use of the innovation as a current user, but with further questioning, this participant is a past user. The participant transitioned into an administrative position but wants to find ways to still use the innovation.
5	7.21 Teacher makes changes to refine or improve use of the innovation, but not major changes. I wonder if that is because the person left school system. Teacher is a veteran like most participants with over 7 years' experience. Compare data with #3 and #10.
6	8.21 Collaborates, research alternatives, shares info about innovation consistently and even tries to find funding for innovation. I wonder about the relationship pf teacher with admin and how long did it take to nurture or develop the relationship. Can this participant get whatever resources needed?
7	8.21 Does not make changes and more day-to-day minor or no adjustments and new to teaching. I wonder about responses after 2 to 3 years of teaching and using the innovation.

8	9.21 Veteran educator, but Mechanical user. I wonder about levels of professional development and if open to admin support.
9	10.21 Seems like a veteran teacher, but level of use of innovation doesn't seem to match teaching experience. I wonder if number of resources or the innovation has varied each year or opportunities to collaborate.
10	10.21 Collaborates with other teachers, wants to learn, but only makes changes in agreement with others. I wonder if lead teacher. Repeats certain terms throughout interview.

Appendix L: Data Saturation Grid

Base size The number of data collection events or interviews	8	9	10
Run Length A run= set of consecutive events or interviews	4	4	2
New information Threshold	<n% new information	<5% new information	No new information

Data Saturation Achieved