DIGITAL JOURNEYS: A NARRATIVE INQUIRY INTO THE EXPERIENCES OF THIRD-GRADE THROUGH FIFTH-GRADE GENERAL EDUCATION TEACHERS IMPLEMENTING INSTRUCTIONAL TECHNOLOGY IN NORTHERN CALIFORNIA

By

Erin Layng

Bachelor of Arts Degree in International Relations, University of California, Davis, 1995
Master of Arts Degree in Educational Leadership, San Francisco State University, 2000

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and reviewed by:

Dorothy Williams Ph.D., Lead Advisor
University of New England

Pamela Thomas, Ed.D. Secondary Advisor
University of New England

Doctor of Education Final Dissertation Approval Form

This Dissertation was reviewed and approved by:

Lead Advisor Signature: Dorothy Williams

Lead Advisor (print name): Dr. Dorothy Williams

Secondary Advisor Signature: Pamela Thomas

Secondary Advisor (print name): Pamela Thomas, EdD, MS, Med

Date: 11/02/23

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ABSTRACT

The problem studied was the utilization of instructional technology in elementary classrooms, from third-grade through fifth-grade, and how teachers experience the use of technology in teaching methods and student learning. The purpose of this qualitative narrative inquiry was to understand the experiences of third-grade through fifth-grade teachers regarding the implementation of instructional technology in their classrooms. The study's timing captured teachers' views on technology before, during, and after the 2020-2021 academic year, which was heavily impacted by the COVID-19 pandemic and distance learning. Qualitative narrative inquiry allowed for a rich exploration of the teachers' experiences, with results of the study informing future decisions and research related to instructional technology implementation in upper elementary settings. Purposeful sampling identified five participants meeting specific criteria. Virtual interviews provided detailed accounts of their encounters with instructional technology. The analysis involved restorying interview data, coding, and member-checking each narrative for accuracy. Four distinct themes emerged from this process: the evolutionary journey of technology integration, collaboration as a mode of professional learning, adaptability to change, and the personalization of learning experiences. The findings of this study underscore the necessity to empower teachers with ample time, resources, and collaborative platforms, enabling effective implementation of instructional technology that significantly enhances their teaching practice and fosters meaningful student learning outcomes.

Keywords: *instructional technology, personalized learning, collaboration, narrative inquiry*

DEDICATION

To my family, I am eternally grateful for your patience and encouragement in pursuing this achievement. To my parents, Brian, and Sue, thank you for instilling a love of lifelong learning. To my children, Zoe, and Zack, thank you for inspiring me to persist and explore new beginnings and lifelong dreams. May you continue to undertake your own adventures in learning and in life. And to Aldric, for believing in me and walking alongside me during this journey. I would not be here without your support.

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CHAPTER 1: INTRODUCTION

Instructional technology literature disproportionately applies to classrooms beyond fifth-grade, with limited studies in elementary school settings. Del Campo et al. (2012) described the historical progression of technology devices on which teachers have come to rely over the last century, ranging from chalkboards to slide projectors, overhead projectors, flip charts, whiteboards, television, video, smartboards, document cameras, and network resources. The utilization of instructional technology in higher education has steadily increased since the 1990s. Del Campo et al. (2012) accurately predicted the expanded use of the internet and improved access to devices in higher education settings. Institutions have recognized the potential of technology to enhance student engagement, promote active learning, and provide flexible learning opportunities. Online and hybrid courses have become more prevalent in both K-12 and higher education, offering students greater accessibility and flexibility in pursuing their education (Allen & Seaman, 2017). An online report published in 2015, *the Organisation for Economic Co-operation and Development* (OECD) examined the integration of technology in classrooms across various nations, projecting that with the growing prevalence of technology and its impact on all educational levels would expand significantly.

The COVID-19 pandemic profoundly impacted education, leading to the widespread adoption of instructional technology in K-12 settings (Dincher & Wagner, 2021). With school closures and social distancing measures, educators had to rapidly transition to remote teaching. As a result, online platforms, video conferencing tools, and educational software became crucial in delivering instruction and maintaining student-teacher connections. Virtual classrooms and learning management systems became the primary means of delivering lessons and sharing educational resources. In addition, video conferencing tools, such as Zoom and Google Meet,

enabled synchronous instruction, allowing teachers to conduct live classes while engaging with students in real time (Hodges et al., 2020).

Del Campo et al. (2012) associated the evolution of instructional technology with a shift in how students learn, contending that the nature of learning has transitioned from passive to more active learning, consistent with social constructivism learning theory (Vygotsky, 1978). Aligned with connectivism learning theory (Siemens, 2005), Del Campo et al. (2012) contended that proper use of technology tools is active because the use of technology can better emulate real-life experiences and increase student engagement. Approaches, such as project-based learning, incorporate the use of technology to simulate real-world situations for students, providing opportunities for them to learn through self-discovery and group collaboration.

While a substantial portion of the current literature on instructional technology primarily examined educational contexts beyond elementary schools, Del Campo et al. (2012) illustrated how the adoption of instructional technology evolved over the past 25 years, aligning with the researcher's professional experiences, which encompass elementary and higher education settings. Instructional technology has significantly transformed, impacting teaching, and learning processes. In the past, instructional technology primarily involved the use of audiovisual aids to enhance classroom presentations, such as film strips, overhead projectors, and slide projectors (Januszewski & Molenda, 2008). However, with advancements in digital technologies, instructional technology has expanded its scope and functionality. This progression entails a shift from hand-drawn or photocopied visuals presented on transparencies and overhead projectors to the utilization of digital images generated in real-time onto a large display monitor through a document camera, adaptive learning systems that can personalize instruction based on individual learner need, and analytics-driven tools for monitoring student progress.

These digital resources can now be accessed by students who are not physically present through a link posted in a learning management system (LMS), such as Google Classroom, which provides a user-friendly and efficient platform for teachers to manage their classes, distribute resources, assign, and grade work, and foster communication and collaboration among students. It streamlines the teaching and learning process, facilitating a more organized and engaging learning environment.

Tondeur et al. (2017) examined technological relationships to educators' pedagogical beliefs. The findings indicate the successful incorporation of instructional technology depends on the presence of supportive professional learning conditions that enable meaningful utilization of technology for improved teaching and learning outcomes. Additionally, according to Alanoglu et al. (2022), the requirements of society in the 21st century necessitate the acquisition of digital literacy skills by both students and educators. Teachers who use interactive whiteboards create an opportunity for dynamic learning experiences and increased student engagement (Alanoglu et al. (2022). Interactive technology allows teachers to create presentations by engaging students in real-time activities, increasing student participation and interest in lessons. Tondeur et al. (2017) found online tools can increase engagement by allowing students to communicate and collaborate with their peers using discussion forums. Online tools, like discussion forums, can be used within or beyond the walls of the classroom, developing a greater sense of community, which can lead to increased meaningful discussions.

This narrative inquiry focused on the instructional technology experiences of upper elementary educators. Narratives are the stories that evolve from “a set of complex relationships among knowledge, contexts and identities,” (Clandinin, 2013, p. 21). According to Clandinin, the role of the researcher in narrative inquiry is to engage in a reflexive and collaborative process

of meaning-making with participants. The researcher is not seen as an objective observer, but instead as a co-participant in the research process. Narrative inquiry tasks the researcher with eliciting and analyzing stories and narratives shared by the participants. Clandinin (2013) emphasizes the importance of building trusting relationships with the study participants by creating a safe space for them to share their stories. Being attuned to the context in which the stories are being shared is important for the researcher to interpret them, regardless of the participants' experiences and perspectives. Clandinin (2013) also highlights the importance of the researcher's own narrative throughout the research process. In other words, the researcher's experiences, beliefs, and values shape their interpretation of the narratives which must be acknowledged and reflexively examined. Further, the researcher must be open to being changed by the research process and willing to explore their own biases and assumptions. In essence, the role of the researcher in narrative inquiry is to collaborate with the participants to co-construct meaning and reflect upon the researcher's own experiences and perspectives in the process.

Since 1992, the researcher of this study has been involved in the field of education, bringing valuable experience to the examination of the topic from an educational perspective. Their career includes teaching in public elementary classrooms and working with graduate-level education programs for aspiring teachers. The researcher has firsthand experience with integrating instructional technology in the classroom, starting with the use of transparencies on overhead projectors and transitioning to modern tools such as conference platforms, digital learning management systems, and real-time data analysis to inform instructional practices. Additionally, the researcher has served as an instructional coach and assistant principal in kindergarten through eighth-grade districts. Most recently, the researcher serves as a consultant

for a non-profit educational organization, and as a clinical supervisor and mentor for teaching licensure candidates.

The professional narrative of the researcher reflects that of a segment of educators who have embraced instructional technology to improve teaching strategies and student learning. However, the researcher's personal experience also includes interactions with colleagues who were resistant to incorporating instructional technology as a tool for teaching and student learning. Understanding the reasons for potential resistance to utilizing instructional technology can offer valuable insights for site and district leaders. Such insights can help shape considerations related to effective professional development initiatives, resource allocation, supportive policies and guidelines, professional learning communities, and personalized support. By identifying these reasons for resistance to instructional technology, leaders can make more informed decisions. For example, if teachers express concerns about limited access to hardware or software, leaders can prioritize investments in the necessary technology infrastructure to address these specific needs.

Understanding of the reasons behind resistance towards technology can provide valuable guidance for leaders when crafting policies, guidelines, and expectations. This understanding can inform the development of targeted professional development programs addressing specific concerns, boost confidence, and improve competence with instructional technology. Professional development can also evolve into collaborative professional learning communities, fostering a supportive environment for ongoing growth and learning. Leaders can create opportunities for teachers to share experiences, strategies, and success stories, allowing reluctant educators to learn from their peers while gaining inspiration and confidence in utilizing instructional technology. To address these concerns effectively, leaders can offer personalized assistance,

coaching, or mentoring to educators who may be struggling with using instructional technology to enhance teaching and learning meaningfully.

In March 2020, with the rapid acceleration of the COVID-19 pandemic, schools of all levels within the United States, and around the world, abruptly shifted to distance learning (Engzell et al., 2021). Students and teachers entered a new era of education, one in which technology became a necessity rather than a choice. The rapid transition to distance learning hastened the speed at which stakeholders, including administrators, teachers, parents, and students, needed to adopt the use of technology for instruction. Engzell et al. (2021) shared that due to this shift, teachers who were previously reluctant to utilize technology in a classroom setting were forced to rely upon it, and subsequently became more adept at utilizing instructional technology.

Despite data indicating some initial backlash against integrating technology following distance learning, anecdotal data suggests an increase in the use of technology continues, even with the return of in-person instruction (Arnett, 2021). Arnett cites examples highlighting the growing prevalence of online learning platforms in education. Platforms like learning management systems (LMS) or virtual classrooms provide a digital environment where teachers and students can interact, access resources, submit assignments, and engage in online discussions. The widespread continual adoption and integration of these platforms demonstrates the increased use of technology to facilitate learning within and beyond the walls of a traditional classroom setting.

Arnett (2021) also mentions the rise of personalized learning software, which utilizes technology to adapt instruction and content to individual students' needs and preferences. These software applications often incorporate algorithms and data analytics to tailor learning

experiences and provide targeted feedback. Personalized learning software can adapt instruction and content to individual students' needs and preferences. Examples of adaptive technology features include assessments that dynamically adjust the difficulty and type of questions based on students' responses, ensuring they receive appropriately challenging questions relevant to their individual abilities. Based on the results of adaptive assessments, personalized learning software can generate individualized learning paths for students. These learning paths outline the specific content and activities each student needs to address their unique learning needs to fill knowledge gaps.

Personalized learning software can also deliver content in various formats, such as text, videos, simulations, or interactive modules, catering to students' diverse learning preferences. For example, visual learners might receive more visual content, while auditory learners might receive more audio-based resources. Personalized learning software can provide immediate feedback and support to students as they engage with the learning materials. This feedback can be tailored to address students' specific misconceptions, provide additional explanations, or offer extra practice opportunities, based on their individual progress. Personalized learning software collects data on students' performance, progress, and engagement with the materials. This data allows teachers and students to monitor their growth, identify areas of improvement, and make data-informed decisions about instructional strategies and interventions. Personalized learning software also enables students to learn at their own pace. Students can progress through the content and activities at a speed that suits their individual learning needs, allowing them to spend more time on challenging concepts or move ahead if they have already mastered specific skills. Finally, personalized learning software can facilitate goal setting and reflection processes for students. Students can set learning goals, track their progress towards those goals, and reflect

upon their achievements and areas for improvement. This reflection process promotes metacognition which helps students take ownership of their learning. The use of personalized learning software exemplifies how technology is being harnessed to cater to diverse student needs by fostering customized learning pathways.

The education technology ecosystem is thriving with startup companies emerging in recent years, developing innovative educational tools, applications, and platforms to enhance teaching, and learning experiences (Arnett, 2021). Examples of recent companies and tools include, adaptive learning programs, such as Khan Academy, which uses personalized recommendations and progress tracking to deliver tailored learning experiences for students, like Labster, which provides virtual laboratory simulations for sciences, allowing students to conduct experiments in a virtual environment. Prodigy is an example of a gamified educational platform focusing on mathematics learning. Designed for elementary and middle school students, Prodigy offers a combination of mathematics practice and an adventure game-style interface. By integrating gameplay elements, Prodigy aims to provide a fun and engaging experience to motivate students to strengthen their mathematics skills.

The prevalence and variety of education technology products signify the growing need, interest, and investment for leveraging technology to transform education. Studies related to technology in education may serve as a valuable resource for researchers, policymakers, and educators interested in understanding how technology has shaped educational practice in the 21st century. A 2021 study by Dubé and Wen examined technology trends in K-12 education from 2011 to 2021. In this study, the authors provided an updated overview of K-12 educational technology trends by examining predictions from seven Horizon Reports, identifying more significant trends, and assessing prediction accuracy using bibliometrics. Dubé and Wen (2021)

also informed their work with a previous study by Martin et al. (2011), which analyzed trends from 2004 to 2010, identifying seven technologies (social web, mobile, games, semantic web, human-computer interaction, learning objects, and augmented reality) in order of impact. Dubé and Wen's (2021) work focused on trends from 2011 to 2017 and identified six technologies (mobile, games, analytics technologies, simulation technology, maker technology, and artificial intelligence) in order of impact. A comparison between the work of Martin et al. (2011) and that of Dubé and Wen (2021) revealed a shift in emphasis within the educational technology space, with social networks losing significance as an emerging educational technology. However, mobile and game technologies continue to exert influence in both periods. In addition, learning analytics and artificial intelligence (AI) have emerged as influential technologies in the recent period that Dubé and Wen studied (2021).

Additionally, the means through which technology may be integrated into teaching and learning continues to evolve. Arnett (2021) discusses the decline in the use of the term "blended learning" while recognizing its continued success through technology integration. Blended learning combines face-to-face instruction with online resources, leveraging technology to enhance flexibility and interactivity. This ongoing implementation and improvement of blended learning models reflect the sustained integration of technology in education. Arnett's (2021) examples include online learning platforms, personalized learning software, and various blended learning models such as the flipped classroom model, where students engage with instructional materials online before coming to class for more interactive discussions and activities and the rotation model, where students rotate between online and offline activities or stations. These instances highlight the growing acknowledgment of technology's capacity to enhance teaching and learning across different educational environments.

Amidst the numerous adverse effects of the COVID-19 pandemic on education, there have been positive aspects resulting from the pandemic and a noticeable surge in opportunities for the integration of instructional technology (Arnett, 2021). Therefore, this study examined third, fourth, and fifth-grade teachers' current perceptions of instructional technology as a tool for teaching and student learning.

Definition of Key Terms

21st-Century Skills. These are the skills, knowledge, and expertise students must master to succeed in work and life; a blend of content knowledge, specific skills, expertise, and literacies; the essential skills for success in today's world, such as digital literacy, critical thinking, problem-solving, communication, and collaboration (Framework for 21st Century Learning Definitions, n.d.).

Achievement Gap. An achievement gap is when one group of students (e.g., students grouped by race/ethnicity, gender) outperforms another group, and the difference in average scores for the two groups is statistically significant (i.e., larger than the margin of error) (National Center for Education Statistics, 2022).

Adaptive Learning Programs. Adaptive learning programs are educational software or platforms that dynamically adjust instruction and content based on individual learners' needs, abilities, and preferences, using algorithms and data analysis to personalize the learning experience in real-time (Feng, 2020, p. 112).

Blended Learning. Blended learning is a formal education program in which a student learns at least in part through online learning with some element of student control over time, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the

modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience (Horn et al., 2014, pp. 34-35).

Connectivism. Connectivism is a learning theory that states that learning can reside outside of ourselves (within an organization or a database) and is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing (Siemens, 2005).

Constructivism. Connectivism is a student-centered learning model whereby students are actively engaged in and have control over their learning process, and the teacher's role is one of facilitation (McLeod, 2019; Tam, 2020).

Digital Divide. A digital divide refers to the unequal distribution of digital technologies and resources, including access to the internet, computers, and digital literacy skills, which results in disparities in information access, educational opportunities, economic development, and social participation (Van Dijk, 2012).

Distance Learning. Distance learning is a form of education which brings together the physically distant learner(s) and the facilitator(s) of the learning activity around planned and structured learning experiences via various two-way, or multi-way mediated media channels that allow interactions between/among learners, facilitators as well as between learners and educational resources (Saykili, 2018, p.5).

Digital Native. Digital native is a term used to describe individuals who have grown up in the digital age, being exposed to and familiar with computers, the internet, mobile technology, and other digital tools from a young age. This contrasts with "digital immigrants," who adopted these technologies later in life (Prensky, 2001).

Educational Technology. Educational technology encompasses the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2008, p. 1).

Elementary Settings. Elementary settings are educational environments specifically designed for primary school-aged children, typically between the ages of 5 and 11 years old. These settings, commonly known as elementary schools or primary schools, provide foundational education across a range of subjects and focus on the development of fundamental skills, knowledge, and social-emotional growth of young learners (Cohen-Vogel et al., 2020).

Gamified Educational Platforms. Gamified educational platforms are digital learning environments that incorporate game elements, mechanics, and design principles to enhance student engagement, motivation, and learning outcomes. These platforms leverage game-like features such as points, levels, badges, leaderboards, and immersive narratives to make the learning experience more interactive, enjoyable, and effective (Mekler et al., 2017).

Google Classroom. Google Classroom is an online tool developed by Google for educators and students to manage assignments, communicate, and collaborate. It integrates Google's suite of tools (like Google Docs, Slides, and Drive) to streamline the educational experience within a digital classroom environment. (Google Workspace for Education, n.d.)

Google Docs. Google Docs is a free, web-based word processing software offered by Google as part of its suite of office tools. Users can create, edit, and store documents online, allowing for real-time collaboration with other users. (Google, n.d.).

Instructional Technology. Instructional technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning (Seels & Richey, 2012, p. 9)

Learning Management Systems. Learning management systems are software platforms that facilitate the administration, delivery, and management of educational courses and training programs. LMSs provide instructors with tools for content creation and organization, communication with learners, assessment, and grading, tracking learner progress, and generating reports. Learners can access course materials, engage in discussions, submit assignments, and receive feedback through the LMS, creating a centralized online learning environment (Sun & Cheng, 2019).

Lexia. Lexia is a technology-based reading program designed to provide explicit, systematic, and adaptive learning in the six areas of reading instruction, offering personalized learning for students, and data-driven action plans for teachers to help improve foundational reading skills (Lexia Learning, n.d.).

Metacognition. Metacognition is the awareness or analysis of one's own learning or thinking processes (Merriam-Webster, n.d.).

Platforms. In the context of technology, platforms refer to software or hardware frameworks that provide a foundation upon which other applications, services, or technologies can be developed and integrated. It typically includes a set of tools, interfaces, and services (Merriam-Webster, n.d.).

Raz-Kids. Raz-Kis is an interactive website designed for elementary school students, offering hundreds of eBooks at 29 different levels of reading difficulty. This platform, commonly used in educational settings, allows students to listen to, read, and even record themselves reading stories, while providing teachers with assessments and progress tracking for their students. Raz-Kids aims to promote reading comprehension and literacy skills through its engaging, student-centered digital resources (Learning A-Z, n.d.).

Social Constructivism. Social constructivism is a theory of learning which posits that learner construction of knowledge is the product of social interaction, interpretation and understanding (Vygotsky, 1978, as cited in Adams, 2006, p. 245).

The Scholastic Reading Inventory (SRI). SRI is a research-based, reading assessment that measures students' reading comprehension level and reports it using the Lexile Framework for Reading. The score from this test helps teachers place students on the correct educational path, adjust their teaching style to students' needs, track students' reading growth over time, and match readers to books appropriate for their skills (Scholastic Parents, n.d.).

Teacher Educator. A teacher educator is a teachers of teachers who is engaged in the induction and professional learning of future teachers through pre-service courses and/or the further development of serving teachers through in-service courses (Murray et al., 2009, p. 29).

Virtual Classroom. Virtual classrooms are online learning environments that simulate traditional face-to-face classrooms, enabling remote teaching and learning experiences. These platforms integrate various tools such as video conferencing, chat functionalities, collaborative whiteboards, and content sharing features to facilitate real-time interaction, engagement, and instruction between teachers and students in a virtual setting (Huang et al., 2020).

Virtual Reality Simulations (VRI). Virtual reality simulations are immersive computer-generated environments or experiences that simulate real-world or imaginary scenarios. They leverage virtual reality (VR) technology, such as head-mounted displays and motion tracking systems, to create a sense of presence and allow users to interact and engage with the simulated environment in a realistic and interactive manner, often providing opportunities for training, education, or entertainment purposes (Ma & Zheng, 2018).

Zone of Proximal Development (ZPD). The zone of proximal development is the difference between what a learner can do without help and what he or she can achieve with guidance and encouragement from a skilled partner (MacLeod, 2019; Vygotsky, 1978).

Statement of the Problem

The problem studied is the utilization of instructional technology in elementary classrooms, from third-grade through fifth-grade, and how teachers experienced the use of technology in teaching methods and student learning. According to Alanoglu et al. (2022), teachers' educational philosophies and attitudes toward instructional technology play a significant role in its effective use as a teaching and learning tool. Positive attitudes and beliefs about instructional technology led to personalized and improved teaching and learning experiences. Conversely, negative attitudes hinder successful integration and can widen existing achievement gaps (Alanoglu et al., 2022).

Alanoglu et al.'s (2022) study demonstrated teachers with positive attitudes effectively integrate technology into their teaching practices, providing engaging, interactive learning experiences, personalized instruction, and fostering student collaboration. This positive implementation of technology enhances student engagement, motivation, and academic achievement (Alanoglu et al., 2022). On the other hand, teachers with negative attitudes, or with a lack confidence for utilizing instructional technology, impeded successful integration (Alanoglu et al., 2022). In such cases, teachers rely on routine tasks and traditional teaching methods, like lectures and direct instruction, limiting the potential benefits of technology and hindering desired learning outcomes (Alanoglu et al., 2022). Teacher’s attitudes and beliefs toward instructional technology significantly impact its effective use, with positive attitudes leading to enhanced teaching and learning outcomes (Alanoglu et al., 2022). Conversely,

negative attitudes impede successful integration and limit the benefits of technology, potentially widening achievement gaps, particularly for students with limited access to technology resources (Alanoglu et al., 2022).

In addition to teachers' disparate attitudes, having a digital divide or limited access to the internet, computers, and digital literacy skills, can contribute to unequal educational opportunities among students. Alanoglu et al. (2022) highlighted the disparities in access to and usage of instructional technology can further widen achievement gaps. Students with limited access to technological resources or less familiarity with technology are at a disadvantage compared to their peers with greater exposure and access (Law et al., 2023). This lack of access can hinder students' ability to engage in online classes, complete assignments, and access educational materials (Law et al., 2023). Furthermore, online assessment disparities can deepen the digital divide because they require reliable internet connectivity and access to digital devices. As a result, students facing the digital divide may encounter difficulties completing online quizzes and tests, leading to unfair evaluation and unequal educational outcomes (Ong, 2020). Students from economically disadvantaged backgrounds may have limited exposure to technology; therefore, they lack necessary digital literacy skills essential for effective utilization of instructional technology (Ong, 2020). This skill gap can impede students' ability to navigate online learning platforms, use educational software, and effectively utilize digital resources (Ong, 2020).

The digital divide can also create a "homework gap" where students without access to digital devices or internet connectivity at home struggle to complete online assignments or engage in self-study (Law et al., 2023). Disparity in access to technology eventually results in unequal education outcomes by hindering students' ability to reinforce their learning outside the

classroom (Perrin, 2020). The digital divide can exacerbate disparities in access to educational resources. Students without access to digital libraries, online databases, and educational websites may have limited access to current and diverse learning materials, putting them at a greater disadvantage when compared to their peers with better technology access (Law et al., 2023).

Although technology has advantages, it is important to recognize the use of instructional technology does not automatically result in improved outcomes. Instead, the effectiveness of instructional technology depends on *how* it is implemented (Hattie & Anderman, 2019). According to Hattie and Anderman (2019), simply employing instructional technology does not ensure enhanced outcomes. The research of Hattie and Anderman (2019) and Alanoglu et al. (2022) highlighted that the key to improving outcomes through instructional technology lies in *how* educators leverage technology to enhance teaching and learning processes. Simply introducing technology into the classroom without thoughtful planning and effective instructional practices with mitigating factors that may contribute to a digital divide may not yield the desired results (Hattie & Anderman, 2019; Alanoglu et al., 2022). Instead, the focus should be on the utilization of technology in teaching and learning. The authors argue the effectiveness of instructional technology relies on its integration into instructional practices, i.e., how teachers incorporate it into their teaching methods (Hattie & Anderman, 2019; Alanoglu et al., 2022). They emphasize the significance of considering pedagogical approaches, instructional strategies, and the alignment of technology with learning objectives. Hattie and Anderman (2019) posited effective integration of instructional technology involves thoughtful planning, implementation, and ongoing evaluation to ensure its positive impact on student achievement.

The effects of the COVID -19 pandemic disrupted the traditional education arena beginning in March of 2020, exacerbating existing inequities, including food insecurity, access

to medical care, and overall physical and mental health throughout society (Supovitz & Manghani, 2022). Historically, schools have provided services related to these societal needs in addition to providing academic instruction. When schools closed to in-person learning, students whose needs were previously met through the school system were left at a greater disadvantage than before the COVID-19 pandemic (Supovitz & Manghani, 2022). In addition to social and emotional negative impacts in school settings, students suffered academic losses due to the absence of in-person instruction from March 2020 extending through or, in some cases, beyond March 2021 (California Department of Education, 2022; Engzell et al., 2021; Pier et al., 2021).

Data gathered from district and state assessments throughout the United States indicate the impact of the COVID-19 pandemic on instruction fueled disparities in academic performance and educational outcomes, particularly among vulnerable students who were already on the lower-performing side of the achievement gap (The Nation's Report Card, 2022). According to the results from the National Assessment of Educational Progress (2022), in the United States a comparison of pre-pandemic scores versus post-pandemic scores of 9-year-olds in both math and reading demonstrated a significant decline and was most dramatic for students at the bottom of the distribution. Higher performing students reported having more learning opportunities during remote learning with access to resources, including high-speed internet, a desktop or laptop computer, a quiet place to learn, support, and access to a teacher (The Nation's Report Card, 2022).

Looking beyond the United States to the Netherlands, known for its robust educational system, the Dutch experienced a closure of in-person instruction for eight weeks during the COVID-19 pandemic (Engzell et al., 2021). Engzell et al. (2021) conducted a study in the Netherlands and found the learning loss experienced by students was proportional to the duration

of time they were unable to attend in-person schooling. Similar to the United States, underserved students in the Netherlands also faced a learning loss of up to 60% higher, placing a heavier burden on disadvantaged students and their families. Engzell et al. (2021) illustrate the challenges students faced during this period, including unequal access to distance learning, disruptions in learning, limited social interaction and support, and differential learning opportunities.

The study underscored students from disadvantaged backgrounds, such as those from low-income families or with limited access to technology and stable internet connections, encountered difficulties accessing remote learning opportunities (Engzell et al., 2021). These students may have experienced significant challenges in participating in online classes, accessing educational resources, and receiving adequate support from teachers. Consequently, these disparities further exacerbated existing educational inequalities and disparities. The abrupt shift to remote learning disrupted the usual structure and routines of schooling. Engzell et al. (2021) found the transition to remote learning was particularly challenging for younger students, students with learning disabilities, and those who require additional support. These students faced difficulties adapting to new learning environments, maintaining focus and motivation, as well as challenges receiving specialized services they typically received in person, potentially leading to additional learning setbacks.

Physical school closures resulted in a significant reduction of face-to-face social interaction among students (Engzell et al., 2021). The Engzell et al. (2021) study suggested the lack of regular social interactions with peers and teachers may have had negative implications for students' social-emotional well-being, engagement, and overall development. The absence of a supportive and stimulating learning environment in schools could further disadvantage students

in terms of their academic progress and social growth. Engzell et al. (2021) discussed how the shift to remote learning varied across households and regions, leading to unequal access to quality education. Some students had access to well-equipped home learning environments, supportive parental involvement, and effective remote instruction, while others faced significant barriers and limitations. This differential access to learning opportunities further exacerbated educational disparities among students. The examples provided in the Engzell et al. (2021) study highlighted the ways in which students were disadvantaged during the COVID-19 pandemic resulting from physical school closures. Unequal access to remote learning, learning disruptions, limited social interaction and support, and differential learning opportunities contributed to learning loss and widened existing educational inequalities.

To mitigate the negative impacts of the COVID-19 pandemic on student learning and academic development, it is essential to engage in effective approaches and strategies for supporting students (United States Department of Education, 2022). According to Yeigh et al. (2020), with proper conditions in place, teachers can utilize technology to improve teacher effectiveness and student learning. These conditions include professional development, collaboration, and data-informed decision-making. Yeigh et al. (2020) emphasize the importance of ongoing professional development to provide teachers with the necessary skills, knowledge, and strategies to integrate technology and implement blended learning approaches effectively. Providing teachers with opportunities for continuous learning and support enhances their effectiveness in using instructional technologies to improve student learning.

The research of Yeigh et al. (2020) highlighted the significance of fostering collaborative learning communities among teachers. Their findings indicated collaborative communities create spaces for teachers to share best practices, exchange ideas, and collaborate on curriculum design

and instructional strategies. Through collaboration, teachers can learn from one another, engage in peer observation, and feedback, and collectively work towards improving their instructional practices and student learning outcomes. Additionally, Yeigh et al. (2020) highlighted the importance of using technology to provide data-informed instruction to enhance teacher effectiveness and student learning outcomes. By utilizing data from formative assessments, feedback, and learning analytics, teachers can monitor student progress, identify areas of improvement, and make informed instructional decisions. This data-driven approach helps teachers personalize instruction, address individual student needs, and adjust teaching strategies to optimize learning outcomes. By attending to the conditions of professional development, collaborative learning communities, and data-informed instruction, schools can support teachers in effectively utilizing technology to enhance student learning outcomes.

With distance learning during the COVID-19 pandemic, teachers and students quickly became reliant upon, and eventually more comfortable with, instructional technology as a tool (Arnett, 2021). Arnett (2021) emphasized that teachers quickly learned to utilize technology in various ways to enhance their instructional practices. Methods in which teachers utilized technology included content delivery and access, personalized learning, collaboration, communication, assessment, and feedback.

Teachers who use technology to deliver instructional content to students may leverage multimedia tools, such as videos, animations, and interactive simulations, to make lessons more engaging and accessible (Arnett et al., 2018). Technology allows teachers to provide students with access to learning materials beyond classroom resources, whether through online platforms or digital resources thereby enabling teachers to implement personalized learning approaches by using educational software and computer-based training programs that adapt to individual

student needs, providing customized instruction and adaptive learning experiences (Arnett et al., 2018). Teachers may also use data-driven tools to track student progress and identify areas where additional support or interventions are needed (Arnett, 2021). According to Arnett (2021), the use of technology facilitated collaboration and communication among teachers, students, and even parents. For example, teachers can use online platforms and virtual classrooms to facilitate discussions, group projects, and peer feedback. In addition, communication tools, such as email, messaging apps, or video conferencing, allow teachers to connect with students and parents, providing ongoing support and feedback.

Technology supports teachers in assessing student learning and providing timely feedback (Arnett, 2021). Teachers can use digital assessment tools, online quizzes, or interactive assignments to gauge student understanding and progress (Arnett et al., 2018). This flexibility enables teachers to provide targeted feedback and make data-informed instructional decisions to address individual student needs. Finally, technology assists teachers in managing their classrooms efficiently. They can use learning management systems and educational software platforms to organize and distribute assignments, track student attendance, and manage grading. As a result, technology can streamline administrative tasks, allowing teachers to focus more on instruction and student engagement (Arnett, 2021).

Teachers utilize technology to deliver content, personalize learning experiences, foster collaboration, and communication, assess student progress, and manage classroom activities (Arnett et al., 2018). By incorporating technology into their instructional practices, teachers can enhance the learning environment, engage students, and support individualized learning experiences. Harnessing the momentum of teachers increased technological aptitude and institutionalizing specialized tools, solutions, and strategies born out of the urgency created by

the COVID-19 pandemic will be essential to addressing some of the adverse effects of the COVID-19 pandemic on student learning (Kotter, n.d.).

Purpose of the Study

The purpose of this qualitative narrative inquiry was to understand the experiences of third-grade through fifth-grade teachers regarding the implementation of instructional technology in their classrooms. The timing of the study is significant in that it incorporated teachers' perceptions of instructional technology in the period before, during, and after the 2020-2021 academic year, which was characterized as an extended span of distance learning due to the COVID-19 pandemic, and during which teachers relied heavily on instructional technology. Qualitative narrative inquiry allowed for a rich exploration of the teachers' experiences, with results of the study assisting with informing future decisions related to instructional technology implementation in third-grade through fifth-grade classrooms, as well as future research.

For purposes of this study, the use of instructional technology in teaching was defined as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels & Richey, 2012, p. 3). This study sought to document and examine the personal narratives of upper elementary teachers utilizing instructional technology.

Research Questions and Design

This study aimed to focus on understanding teachers' perceptions and experiences with instructional technology in teaching and student learning. By examining data generated from interviews, the research aimed to provide insight into the lived experiences and perspectives of the participants. Through analysis, the study sought to shed light on the problem statement by

deepening the understanding of teachers' utilization of instructional technology in their teaching practice for student learning. This qualitative narrative inquiry contained two research questions:

> **Research Question 1:** How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology?
>
> **Research Question 2:** How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?

Conceptual and Theoretical Framework

The stories of the participants in this study were elucidated by examining experiences and perceptions of participants through Kotter's (2012) eight-step guiding principles for change, which served as the conceptual framework for the study ~~(2012)~~. The conceptual framework also relied on the interplay of themes revealed in the narratives of participants and the themes revealed in the literature. Kotter's (2012) eight-step guiding principles for change provided a useful conceptual framework for examining the conditions that may influence educators' integration of instructional technology. As described by Kotter (2012), the steps are:

> Establishing a sense of urgency, creating the guiding coalition, developing a vision and strategy, communicating the change vision, empowering a broad base of people to take action, generating short-term wins, consolidating gains, producing even more change, and institutionalizing new approaches in the culture. (pp. 21-22)

Kotter's (2012) conceptual framework of change suggests educational leaders and teachers who thoughtfully adopt and integrate instructional technology by engaging stakeholders in environments valuing professional learning and collaboration can customize learning

experiences through data-informed decisions that guide instruction and result in improved learning outcomes for students. This inquiry examined whether similar themes were revealed in the narratives of participants. In addition to Kotter's (2012) principles for change, this narrative inquiry was conducted through the overlapping lenses of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005), serving as the theoretical frameworks, and used as part of this study's conceptual framework. While discrete from one another, for purposes of this study, connectivism was viewed as an evolution of social constructivism, with the intentional incorporation of instructional technology as an integral component (Vygotsky, 1978; Siemens, 2005).

Kimmons and Cascurlu (2020) argued that social constructivism emphasizes the responsibility of students to construct their own knowledge, while the teacher assumes the role of designer and coordinator. This system aligns with the conclusions drawn by Del Campo et al. (2012), which indicate a correlation between the adoption of instructional technology, active learning, increased student engagement, and student agency. In the constructivist approach, the student plays an active role in acquiring knowledge, while the teacher acts as a facilitator (Vygotsky, 1978). Vygotsky's work emphasizes the importance of the teachers' providing students with scaffolding, or support, as they learn, and encouraging them to learn by doing and through social interaction. The teacher's role is to create a learning environment where students can explore, learn, and grow (Vygotsky, 1978). In addition to hypothesizing that learning is collaborative, inclusive of problem-solving, and depends on social interaction, Vygotsky's (1978) theory of social constructivism includes the concept of a zone of proximal development (ZPD), described as the difference between a child's developmental level of problem-solving, and that of their potential to problem solve with collaboration from peers or scaffolding from a

teacher. Consistent with some of the 21st century skills required of students, such as critical thinking, collaboration, communication, and creativity (the 4C's) (Framework for 21st Century Learning, 2019), Vygotsky (1978) contends "learning is the acquisition of the ability to think" (p. 83). In addition to the ability to think, the 4C's required of students in today's classrooms necessitates that students practice metacognitive skills, thinking about, and communicating their thinking and learning.

For purposes of this narrative inquiry, connectivism was viewed as an evolution of Vygotsky's (1978) social constructivism and was considered appropriate for the post-pandemic landscape of education, of which technology is a part. Siemens (2005) described the principles of connectivism as inclusive of seeing connections between fields, ideas, and concepts while being focused on current information. Siemens also contended learning can occur using non-human devices with the choice of meaning and change among incoming information as essential elements of connectivism. Connectivism explicitly acknowledges learning occurs beyond the walls of the classroom, both through the internet, other networks, and experiences. Teachers can harness technology to maximize student outcomes by identifying pedagogical practices grounded in theory, such as social constructivism and connectivism (Siemens, 2005; Vygotsky, 1978). The narrative interviews of participants allowed individuals to reflect on, create meaning from, and examine the relationship between their use of instructional technology, their teaching, and student learning.

Assumptions, Limitations, and Scope

Researchers' assumptions about a topic of study inform the methodology and design of the study (Creswell & Guetterman, 2019). For purposes of this qualitative narrative inquiry, it was assumed the sample size would not be large enough to warrant a quantitative or mixed-

methods approach. The scope of the narrative inquiry was limited to a sample population of 12 third, fourth, and fifth grade general education teachers in a public school district in a suburb of Northern California. Additional assumptions included the ability to amass sufficient participation and facilitate productive interviews to generate data to inform the research questions. Finally, the researcher assumed participants would answer honestly during their interviews, providing relevant details describing their experiences and perceptions related to instructional technology. Member-checking was utilized to ensure participants' stories are accurately depicted.

This narrative inquiry was subject to several limitations inherent to qualitative research. First, as noted by Merriam and Tisdell (2016), the nature of the "researcher as the primary instrument for data collection and analysis" was a limitation to be acknowledged (p. 45). Additional limitations inherent to interviews included the indirect nature of the information provided, filtered through participants' views and biases, the artificial setting of an interview, and the varied degree to which participants were or were not able to articulate their perceptions and accurately recall information from the past (Creswell & Guetterman, 2019). Additionally, the small sample size presented a limitation concerning the generalizability of the results. Finally, as a former employee of the district and a current consultant for an educational technology organization, the researcher's personal bias was a limitation that required acknowledgment. The scope of the narrative inquiry was limited to a sample population of 12 third, fourth, and fifth grade general education teachers in a public school district in a suburb of Northern California. For this study, the researcher used the pseudonym of Magnolia School District when referencing the district where participants are employed.

Rationale and Significance

The significance of this narrative inquiry is the impetus of school districts and site leaders facilitating expanded pedagogy that incorporates technology more readily to meet the needs of students and potentially decrease the achievement gap for underserved populations by personalizing instruction (Arnett et al., 2018; Jung et al., 2019). In an examination of factors contributing to the integration of instructional technology in elementary classrooms, Jung et al. (2019) determined motivational support is the most critical factor for the integration of technology by elementary teachers. In their work examining how school leaders can motivate teachers to engage with initiatives, such as technology, Arnett et al. (2018) determined teachers have various motivations to adopt instructional initiatives. These motivations can range from a desire to create engaging content, improve student outcomes, or more effectively manage time. According to Arnett et al. (2018), leaders can promote buy-in and effectively address the diverse needs of students and teachers by demonstrating the advantages of instructional technology.

Secondly, the COVID-19 pandemic's impact on the teaching profession must be considered. Sokal et al. (2020) emphasize the job demands of teachers have undergone significant changes, leading to a consequential shift in the role of technology in classrooms. As teachers now face increased responsibilities, including the effective integration of new instructional technology and the analysis of data to inform their teaching, there is a heightened need for dedicated time and opportunities for professional learning and collaboration among educators. As noted by Sokal et al. (2020), it is essential educational leaders acknowledge the increased requirements asked of teachers, such as learning how to utilize new instructional technology effectively. By providing the resources necessary for teachers to meet those requirements, leaders can reduce the stress levels incurred by teachers. Resources related to

effectively integrating educational technology may range from procuring and maintaining classroom devices and programs to professional development and collaboration opportunities.

Kotter (2012) describes embracing change, growth, and forward-thinking as essential leadership skills for lifelong learners. Teachers gained many technical skills during the distance learning phase of the pandemic (Yeigh et al., 2020). However, new protocols, refined curriculum, and the need to meet students' more comprehensive academic and social-emotional needs, call for additional resources, training, collaboration, and time. It is the responsibility of districts' leadership to provide the resources required for teachers to meet the needs of their students. Harnessing educational technology can provide powerful means to meet the needs of students and streamline data for teachers, creating greater efficiency, reducing teacher stress, and improving student outcomes through more personalized learning (Arnett et al., 2018). By capitalizing on the momentum of technical skills obtained by teachers and students during the pandemic, leaders and teachers can improve outcomes and create 21st-century learners (Yeigh et al., 2020).

Summary

Given the impact of the COVID-19 pandemic on education, the corresponding drop in student performance, and the increase in the availability of instructional technology, educational leaders have the opportunity to align 21st-century knowledge about instruction, students, and learning with systems and practices (Arnett, 2021; Bergdahl & Bond, 2021; 2022; Framework for 21st Century Learning, 2019; The Nation's Report Card, 2022). The guiding theories and frameworks of social constructivism and connectivism provided lenses through which this researcher examined the perceptions of participants as they relate to the use of instructional technology in teaching and student learning. This qualitative narrative inquiry explored the lived

experiences and perceptions of third-grade through fifth-grade educators, along with the themes of 21st-century learning, leadership, professional development, collaboration, student outcomes, and personalized learning to be examined in Chapter 2, with the expectation of contributing to the research surrounding instructional technology at the elementary grade levels and how it may be harnessed to improve teaching and student learning.

CHAPTER 2: LITERATURE REVIEW

The purpose of this qualitative narrative inquiry was to explore the lived experiences of third-grade through fifth-grade teachers related to the implementation of instructional technology. This study examined teachers' perceptions of implementing instructional technology in their teaching and for student learning. Gaining insights into teachers' viewpoints on instructional technology can offer valuable guidance to school and district leaders, aiding them in decision-making processes and informing effective professional development initiatives. Instructional technology resources include those aligned with grade-level content, such as digital versions of adopted textbooks and their accompanying features, including text-to-voice or embedded formative assessments, platforms, or learning management systems, to facilitate the organization and delivery of content.

Before 2021, much of the scholarly literature on instructional technology was focused on post-secondary or higher education, rather than elementary education (Alamri et al., 2020; Del Campo et al., 2012). Due to the limited literature specific to instructional technology in elementary settings, this literature review drew upon theories and scholarly research related to instructional technology in various settings, including middle schools, high schools, and higher education. For purposes of this study, instructional technology was defined as "[t]the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Seels & Richey, 2012, p. 9). Reiser (2018) defined instructional technology similarly to Seels and Richey (2012), noting it involves the systematic use of technological tools, resources, and strategies to enhance teaching and learning experiences, promotion of effective communication, and facilitation of information access while supporting instructional objectives and outcomes. These definitions include instructional technology

programs and resources aligned with grade-level content, as well as platforms, or learning management systems, which facilitate the organization and delivery of content.

Seels and Richey (2012) presented examples of instructional technology, showcasing various multimedia tools, such as videos, animations, and interactive simulations that effectively deliver content and engage learners. They also highlighted educational software and computer-based training programs offering customizable and flexible learning experiences. Furthermore, the authors discussed online learning platforms and virtual classrooms for delivering instruction, which also foster collaboration and communication among teachers and students. Mobile devices, including tablets and smartphones, provide access to learning materials *on the go* and allow students to access distance learning technologies, such as videoconferencing and webinars, connecting learners and instructors in different locations (Seels & Richey, 2012). Learning management systems (LMSs) and other platforms are important for tracking student progress, providing feedback, and incorporating games and simulations to enhance engagement and reinforce learning outcomes (Seels & Richey, 2012). These learning management systems and platforms evolve over time. Current examples of learning management systems include Canvas and Google Classroom. Learning management systems equip educators with tools to create and organize content, communicate with students, assess their work, monitor their progress, and generate reports. Students can utilize the LMS to access course materials, participate in discussions, submit assignments, and receive feedback, resulting in the establishment of a centralized online learning setting. LMS's can be used to organize content and include links to platforms for use by students. Khan Academy is an example of an online platform which offers a vast collection of educational videos, practice exercises, and personalized learning resources across subjects like mathematics, science, and humanities.

The rapid acceleration of instructional technology use by elementary teachers during the COVID-19 pandemic of 2020 was in response to the shift to distance learning, resulting in the need to redesign and deliver elementary content through technology platforms, rather than traditional physical classrooms. The COVID-19 pandemic of 2020 created an urgency in education that accelerated the reliance on instructional technology throughout all grade levels. Distance learning compelled elementary educators, who may have otherwise been reticent, to rely on technology, and to become proficient (Alanoglu et al., 2022).

Although in-person classes have been reinstated, the skills required of teachers and students in the 21st century demand the continued integration of instructional technology within classroom settings (Alanoglu et al., 2022; Tondeur et al., 2017). By leveraging technology, educators can create more dynamic and interactive learning experiences to prepare students for success in the modern world. Alanoglu et al. (2022) noted instructional technology can enhance student engagement and motivation in the learning process by providing opportunities for interactive and personalized learning experiences for students to connect their learning to real-world contexts. Further, technology facilitates collaboration and communication among students and teachers, which are important learning tools for promoting engagement and motivation skills for the 21st-century workforce (Alanoglu et al., 2022; Tondeur et al., 2017). With technology skills becoming increasingly important, educational systems must adapt to meet technological needs. Alanoglu et al. (2022) and Tondeur et al. (2017) emphasized technology as enabling more individualized and student-centered learning experiences suited to the diverse needs and interests of modern learners.

Prior to 2021, much of the scholarly research literature about instructional technology focused on settings other than elementary education, particularly post-secondary, or higher

education (Alamri et al., 2020; Del Campo et al., 2012). The COVID-19 pandemic of 2020 created an urgency in education that accelerated reliance on instructional technology throughout all grade levels, including elementary educators who may have otherwise been reticent become proficient (Alanoglu et al., 2022). Kotter (2012) described embracing change, growth, and forward-thinking as essential leadership skills for lifelong learners. As campus and classroom leaders, site administrators and teachers play a crucial role in modeling lifelong learning and demonstrating how to embrace change when necessary. Site administrators and teachers can demonstrate continual learning by engaging in ongoing professional development to enhance their knowledge and skills, which can include adopting new technologies to enhance teaching and learning, as well as actively collaborating with colleagues to share ideas, resources, and best practices. Additionally, administrators and teachers can exhibit flexibility and adaptability by proactively seeking innovative approaches to address challenges by embracing new instructional strategies to support student success. Modeling lifelong learning by embracing change can inspire and empower colleagues and students to become lifelong learners, prepared to adapt to the evolving educational landscape (Kotter, 2012).

According to Collins and Halverson (2018), “to earn a decent wage in the future will require lifelong learning and expertise with information technologies” (p. 5), which suggests, educational leaders and classroom teachers can model utilizing technology for teaching and learning. This study sought to examine third, fourth, and fifth-grade teachers’ experiences with the use of instructional technology for teaching and student learning. The study examined the period including the 2020-2021 academic year up until the present, which encompasses the COVID-19 pandemic and the subsequent transition back to in-person learning.

Conceptual and Theoretical Framework

A conceptual framework serves as both a lens through which a study may be conducted and a guide informing the design and methodology of the study (Ravitch & Riggan, 2017). A theoretical framework is a component of the conceptual framework that grounds this study in existing theory (Ravitch & Riggan, 2017). Together, the conceptual and theoretical frameworks provide a foundation for the interplay of themes revealed in the data and literature, the architecture of the study, and the lens through which the researcher examines the information.

As observed by Ravitch and Riggan (2017), conceptual frameworks evolve with the study and, as such, the researcher is aware the participants' narratives may reveal themes and conditions not included in the literature. The successful integration of instructional technology relies on and evolves from the interaction of different conditions within the site and district levels. By examining and determining the relationships and interactions of themes in the literature and the experiences of study participants, educators and leaders can better integrate technology to improve teaching methods and student outcomes. Kotter's (2012) eight-stage process for change provides a useful conceptual framework to examine instrumental conditions directed at integrating instructional technology in upper elementary settings. Kotter's (2012) eight steps are identified as creating a sense of urgency, creating a guiding coalition, developing a vision and strategy, communicating the change vision, empowering broad-based action, generating short-term wins, consolidating gains, and producing more change, and anchoring new approaches in the culture.

In the spring of 2020, a sense of urgency, the first step in Kotter's (2012) change process, was inherent in the rapid shift to distance learning, resulting from the COVID-19 pandemic. Teachers were forced to utilize technology almost overnight, to meet the conditions of their

work. Steps two through five of Kotter's (2012) change process include, creating a guiding coalition, developing a vision and strategy, communicating the change vision, and empowering a broad base of people to take action. Components of each step revealed themselves within the literature surrounding instructional technology, through themes of leadership, professional learning, and opportunities for collaboration (Agostini, 2013; Bass et al., 2008; Corbett & Spinello, 2020; Linton, 2018; Marion & Gonzales, 2014; Marzano et al., 2005). Research demonstrates successful integration of instructional technology coinciding with improvements in student outcomes based on Kotter's (2012) remaining steps, generating short-term wins, consolidating gains, producing more, and anchoring change in the culture, (Wilkes et al., 2020; Zheng et al., 2022).

Consistent with Kotter's (2012) eight steps as an overlay, much of the literature contends instructional technology can facilitate personalized instruction, resulting in improved outcomes for students (Bergdahl & Bond, 2021, 2022; Public Impact & Clayton Christensen Institute, 2018; Wilkes et al., 2020; Yeigh et al., 2020; Zheng et al., 2022). Personalized learning is a tenet of both social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005), the theoretical frameworks providing overlapping lenses through which this study is conducted. As noted by Gross et al. (2018), "personalized learning calls on students to be active co-constructors, making choices in how they learn, co-creating their learning experiences and pathways through learning, progressing through content as they demonstrate competence, and engagement their communities outside the school" (p.4). The use of instructional technology enables personalized learning through various features, including adaptive technology and real-time data collection. These features allow instruction tailored to individual students' needs and preferences. Adaptive technology adjusts the learning experience based on learners' progress,

strengths, and areas requiring improvement. Real-time data collection provides immediate feedback and insights into students' performance, allowing teachers to make timely instructional decisions, while providing targeted support. By leveraging instructional technology, personalized learning can be implemented to enhance the educational experience for students. Examining the participants' narratives will elucidate if instructional technology implementation reflects enhanced educational experiences in practice.

Personal Interest

The researcher's interest in the topic of instructional technology lies in its transformative potential and a belief that instructional technology can serve as a potent tool for educators to collaborate, engage students, customize learning experiences, and adeptly monitor student progress. Recognizing its ability to revolutionize the teaching and learning landscape, technology holds the promise of fostering a more dynamic, engaging, and equitable educational environment for all students.

The researcher's appreciation of technology-enhanced teaching and learning is rooted in its capacity to cultivate deeper engagement and personalized learning. Through technology, students have the potential to gain access to a plethora of interactive and multimedia resources, capturing their attention and sparking curiosity. Technology also empowers educators to tailor instruction to individual student needs, forging personalized learning pathways that accommodate various learning styles and paces.

The researcher is particularly intrigued by the potential of technology in supporting students facing academic challenges or those with special needs. Technology offers these students access to assistive tools, adaptive learning platforms, and personalized instruction, enabling them to surmount obstacles and actively participate in the learning process. Finally,

technology facilitates communication and collaboration among students, teachers, and parents, establishing a supportive network that fosters academic success with the support of stakeholders.

The researcher's dedication to technology-enhanced teaching and learning extends beyond theoretical understanding. Actively seeking opportunities to incorporate technology into learning experiences, she is committed ongoing professional development in this field, exploring emerging technologies and adopting best practices to seamlessly integrate technology into the teaching approach. When used thoughtfully and strategically, technology can serve as a powerful catalyst for educational transformation, empowering educators to create vibrant and inclusive learning environments conducive to the success of every student.

Topical Research

The existing literature on instructional technology reveals several major themes, including leadership, professional development, student outcomes, and personalized learning (Arnett et al., 2018). These themes are examined from the perspectives of both social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005). They encompass overarching concepts such as leadership, professional development, and collaboration, which are conditions that influence more specific aspects of instructional technology, like student outcomes and personalized learning.

This research supports the implementation of instructional technology in a number of ways. First, it highlights the importance of leadership in supporting the use of instructional technology (United States Department of Education, 2022). Effective leaders create a vision for the use of technology in teaching and learning, and they provide the resources and support that teachers need to implement new technologies (Arnett et al., 2018).

Second, the research emphasizes the need for professional development to help teachers learn how to use technology effectively (Arnett, 2021). Teachers need to be able to integrate technology into their teaching in ways that are meaningful and engaging for students (United States Department of Education, 2022). They also need to be able to use technology to assess student learning and to differentiate instruction based on student needs (United States Department of Education, 2022).

Third, the research shows that instructional technology can have a positive impact on student outcomes. For example, studies have shown that students who use technology in the classroom are more likely to be engaged in their learning and to achieve higher academic outcomes (United States Department of Education, 2022).

Finally, the research supports the use of instructional technology to support personalized learning (Arnett, 2021). Personalized learning is an approach to teaching and learning that tailors the instruction to the individual needs of each student. Technology can be used to provide students with access to personalized learning resources and to track their progress (UNITED STATES Department of Education, 2022).

Theoretical Frameworks

The theoretical frameworks utilized in this study were social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005). Social constructivism is a theory of constructivism developed by Vygotsky (1978). Social constructivism contends cognitive development relies heavily on sociocultural interaction (McLeod, 2022). Connectivism further acknowledges learning is not confined to individuals but can also occur within organizations or databases. By prioritizing the establishment of connections between specialized information sets, the connections become more valuable than our singular existing knowledge or understanding

(Siemens, 2005). An example of connectivism in educational technology is online discussion forums or learning management systems (LMS), where students are encouraged to engage in online discussions to interact with their peers, as well as access various online resources, such as databases, articles, or multimedia content. Through these interactions and connections, which rely on technology, students explore different perspectives, collaborate on projects, and share their own insights. Connectivism acknowledges learning has no classroom boundaries, or restrictions of teacher knowledge. Instead, connectivism highlights the value of networking, collaboration, and tapping into various specialized information sets of previous knowledge (Vygotsky, 1978). Connections formed through interactions become a vital component of the learning process, fostering a dynamic and collaborative learning environment that expands individual knowledge and understanding to the knowledge and understanding from all connections (Vygotsky, 1978).

Social Constructivism

According to McLeod (2019), social constructivism requires students to actively participate in their own learning through collaboration and problem-solving, while the teacher assumes the role of facilitator, rather than simply dispensing information. Thus, the teacher acts as a coordinator, while students collaborate with each other to construct their own meaning of content (McLeod, 2019; Vygotsky, 1978). McLeod (2019) also noted Vygotsky's assertion of social interactions during guided learning as occurring within the zone of proximal development, aiding in constructing knowledge among children.

In a classroom setting, Tam (2020) described four basic traits shared by teachers consistent with social constructivism, including shared knowledge between students and teachers, shared authority or choice, small learning groups, and the teachers' role as a facilitator.

Additionally, Tam described classrooms reflective of social constructivism, including collaboration and cooperation, while encouraging students to engage in critical and reflective thinking. These learning characteristics are consistent with the thoughtful use of technology, which may be considered adverse in a traditional classroom of passive or one-directional learning. McLeod (2019) evaluated a traditional classroom that adhering to a fixed curriculum, often repetitive, where students passively receive information in isolation from a directive teacher. Traditional classrooms conflict with classrooms valuing social constructivism which focus on students' interests, questions, and inquiries (McLeod, 2019; Tam, 2020). In social constructivism, content is built upon prior knowledge, driven by students, and learning is didactic, with students being active participants through collaboration, often in small groups (McLeod, 2019). The incorporation of instructional technology provides students with elements of control and choice (Horn et al., 2014).

A study conducted by Ayse (2018) reviewed the literature to examine the relationship between instructional technology and Constructivism, concluding technological tools facilitate Constructivism by providing opportunities for students to understand their learning differences better by accessing content in an individualized manner. These metacognitive skills are also consistent with principles of social constructivism, in which students are active in their learning, building upon their prior knowledge. According to *The Framework for 21st Century Learning* (2019), students in today's classrooms must become proficient in critical thinking, collaboration, communication, and creativity (the 4C's). Acquiring the 4C's skills requires students to use metacognitive skills by thinking about and communicating their own thinking and learning. Opportunities for practicing these skills are inherent to social constructivism and can be facilitated using instructional technology. Given the close alignment of traits and

characteristics, the incorporation of instructional technology in classroom settings is appropriately viewed with social constructivism as the theoretical lens.

Connectivism

According to Siemens (2005), connectivism is the integration of concepts and theories of chaos and networks. Siemens shares connectivism recognizes learning happening within dynamic environments, emphasizing the role of connections and networks in acquiring knowledge. Connections enable learners to differentiate between valuable and less important information, promoting the development of critical thinking skills. Siemens (2005) described the principles and values of connectivism as including diverse opinions, connecting resources and information through networks and devices, acknowledging the unknown, having the curiosity to acquire more knowledge, and having the ability to make decisions as a learning process. Through interactions and connections, students can explore different perspectives, collaborate on projects, and share their own insights. Connectivism emphasizes learning is not solely acquired information from a single source, but rather by connecting with diverse sources of information and viewpoints, students are encouraged to critically analyze and synthesize information from different sources, contributing a greater comprehensive understanding (Siemens, 2005).

Dunaway (2011) indicated, conceptually speaking, a connectivism approach to learning requires the association between the linking of ideas and concepts. From a social perspective, connectivism involves interaction with others "across networked communities and information technologies" (Dunaway, 2011, para. 2). Dunaway's analysis of connectivism aligns with collaborative pedagogical models, in which students have opportunities to interact with one another, as well as teachers, both in-person and while using distance-learning technology. Dunaway (2011) explored the concept of connectivism and its implications for instructional

models, emphasizing the significance of adapting instructional practices to match the evolving nature of information landscapes, i.e., technology, to address the needs of learners to acquire and construct knowledge. By embracing instructional principles of social constructivism, learners can experience the benefits of teachers who foster active engagement, collaboration, and the exploration of diverse digital resources for information.

Kivunja (2014) emphasized the relevance of connectivism as a learning framework for the 21st century, recognizing students today require a different skill set than when social constructivism was developed by Vygotsky (1978). In addition to academic skills, such as reading, writing, and mathematics, students must also develop critical thinking, problem-solving, collaboration, leadership, and digital literacy. Technology plays a crucial role in facilitating instruction, learning, and gathering data to identify students' proficiency and areas for growth within their zone of proximal development (Kivunja, 2014; Vygotsky, 1978). Therefore, Kivunja (2014) argued pedagogies need to evolve to meet the demands of today's students, and connectivism, which builds upon social constructivism, addresses these 21st-century skills.

The intersection of social constructivism and connectivism offers a valuable basis for educational leaders to foster professional development among teachers and facilitate collaborative efforts to enhance pedagogy and best practices. This approach encourages the integration of instructional technology to improve student outcomes. Instructional technology provides students with the opportunity to connect and seek information beyond the walls of the classroom, allowing for choice and agency (Collins and Halverson, 2018). Further, Collins and Halverson stated intentional use of instructional technology can provide students, teachers, and educational leaders with specific data to inform instruction by personalizing student learning, thereby developing students' skills to succeed within and beyond the classroom.

The evolution of technology and pedagogy coincides with a transition from social constructivism toward connectivism (Siemens, 2005; Vygotysky, 1978). In a study entitled *The History of Technology in Education: A Comparative Study and Forecast*, Del Campo et al. (2012) described the historical progression of instructional technology teachers have come to rely upon over the last century; from chalkboards to slide projectors, overhead projectors, flip charts, whiteboards, television, and video, smartboards, document cameras, and network resources. Consistent with social constructivism, Del Campo et al. (2012) correspond the evolution of instructional technology with a shift in how students learn, contending the nature of learning has transitioned from passive to more active learning. Additionally, Del Campo et al. (2012) posit proper use of technology tools can better emulate real-life experiences and increase student engagement, characteristics consistent with Siemen's (2005) connectivism. Although the research of Del Campo et al. (2012) refers to higher education settings, it parallels the anecdotal experiences of the researcher in elementary settings, particularly in more recent years.

The literature on instructional technology revealed several major themes, which include leadership, professional development and collaboration, student outcomes, and personalized learning. These themes were examined from the perspectives of both social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005). They encompass overarching concepts such as leadership, professional development, and collaboration, which are conditions that influence more specific aspects of instructional technology, like student outcomes and personalized learning. Comparing the themes present in the literature using the theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005), with the narratives shared by participants in the study, educational leaders can gain valuable insights to inform their policy and decision-making processes regarding instructional technology.

Much of the current literature related to instructional technology in education is focused on settings other than elementary grades prior to the pandemic era of distance learning when many teachers gained technological skills (Del Campo et al., 2012; Engzell, 2021). Existing studies conducted in elementary settings often focus on a particular digital tool, such as *Lexia Core 5*, a digital literacy program aimed at helping K-5 students master foundational reading skills (Wilkes et al., 2020). Several scholarly authors have focused specifically on blended learning pedagogy, which incorporates instructional technology (Agostini, 2013; Horn et al., 2014; Tucker, 2021). Much of the existing research is grounded in social constructivism (Vygotsky, 1978), with more current research being reflective of connectivism (Siemens, 2005). Examination of the existing literature on instructional technology reveals consistent, interrelated themes. These themes are presented in order from general to specific, with the broader themes of 21st-century learning, leadership in instructional technology, professional learning, and technology, and the importance of collaboration, impacting the more specific themes of student outcomes and personalized learning experiences (Alanoglu et al., 2022; Framework for 21st Century Learning 2019; Tucker, 2021; Yeigh et al., 2020).

21st-Century Learning

Proponents of instructional technology assert digital literacy and proficiency are crucial for both educators and students (Alanoglu et al., 2022). They advocate for integrating content knowledge with essential skills, for example, communication, collaboration, problem-solving, and critical thinking, highlighting their importance in achieving success. According to the *Framework for 21st Century Learning* (2019),

> 21st-century skills implementation requires developing key academic subject knowledge and understanding among all students. Those who can think critically and communicate

> effectively must build on a base of key academic subject knowledge. Within the context of key knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem-solving, communication, and collaboration. (2019, p. 1).

The Framework for 21st-Century Learning (2019) explicitly recognized the importance of information, media, and technology skills as integral components of learning in the 21st century. The framework emphasizes students' need to develop proficiency in effectively accessing, evaluating, and using information from various sources. This access includes understanding how to navigate digital tools and platforms, critically analyze and interpret media messages, while ethically using and sharing digital content. In addition, the framework highlights the significance of technology skills in enabling students to create, collaborate, communicate, and problem-solve in this digital age. To enhance learning and prepare for future careers, students must be proficient using various technologies, such as computers, mobile devices, software applications, and online resources. By explicitly incorporating information, media, and technology skills, *The Framework for 21st-Century Learning* (2019) recognizes technical competencies' essential role is to equip students with the knowledge and skills necessary for success in an increasingly interconnected and technology-driven world.

Critics of the rapid expansion of instructional technology cite ethical concerns, including student privacy, big data, surveillance, and ownership of information (Regan & Jesse, 2019). In a 2019 study, Kumar et al. found that among elementary teachers who integrate technology, explicit lessons about privacy and security were rare. As the continual rise in demands of teaching and learning in the 21st century includes digital and technological literacy, there will be

an increased requirement for safeguards and resources to support students and teachers (Regan & Jesse, 2019).

Leadership in Educational Technology

The successful implementation of any initiative relies on alignment with organizational mission, as well as the capacity of stakeholders to embrace change (Bass et al., 2008). A leader acts as a guide, identifying areas for change to make progress toward an agreed-upon mission through a shared vision. Bass et al. (2008) contended effective leaders understand leadership and followership as reciprocal, serving as an example to their subordinates, while influencing colleagues at various levels in an organization. Bass et al. (2008) shared that when implementing a shift from traditional instruction to one using instructional technology for enhancing teaching and learning, the effectiveness of this change initiative may rest on the shared goal of improving student outcomes as the vision of the organization.

Leading from the Middle

Agostini (2013) described *leading from the middle* as a leadership approach focusing on collaboration and influence, rather than formal authority. This style of leadership can be employed by individuals who may not hold top-level positions but have the ability to influence and drive change within an organization. To facilitate the successful implementation of instructional technology usage, site leaders must be empathetic and lead from the middle by understanding the roles of various stakeholders and the individual needs of teachers. Agostini emphasized leading from the middle involves recognizing and leveraging the expertise, skills, and perspectives of colleagues and team members. It requires building strong relationships, fostering open communication, and creating a shared vision aligning with the goals of the organization. Leading from the middle can effectively empower and engage others, drive

innovation, encourage collaboration, and foster a positive and productive work environment (Agostini, 2013).

Educational leaders can model leading from the middle by fostering the integration of technology by implementing various strategies in classroom environments. For example, flexible schedules accommodating teachers' professional development activities, or allocating funds to acquire an adequate quantity of devices and software for students foster learning and change (Linton, 2018). Effective leadership requires taking appropriate actions, while understanding how changes in one area of an organization impacts other areas. Enacting change through sense-making involves highlighting events aligning with the organization's direction and mission, while providing options for teachers to engage and support the initiative (Marion & Gonzales, 2014).

According to Marzano et al. (2005), there is a significant correlation between leadership, as measured by principals' behavior, and students’ achievement in a school. Teachers rely on site leadership to create a culture promoting professional learning opportunities, modeling best practices, and designing an environment conducive to implementing educational technology (Marzano et al., 2005). Best instructional technology practices occur when leaders ensure a sufficient number of devices, select effective software programs to facilitate data collection, and create time for teachers to analyze the data and collaborate (Collins & Halverson, 2018; Papa, 2010).

Leadership in the Classroom

According to Corbett and Spinnello (2020), leadership within the framework of social connectivism differs from social constructivism in the classroom, where the teacher takes on the role of the sole facilitator. In social connectivism, leadership involves multiple stakeholders

working collaboratively, rather than relying on one person. This approach enables a network of stakeholders to contribute content through engagement and collaboration. In the context of instructional technology integration, leadership is not limited to district and site administrators, but also extends to classroom teachers. Bergdahl and Bond (2021; 2022) suggest teacher management and self-efficacy affect the level of student engagement, including teacher willingness to comfortably lead and navigate, both digitally and in-person, to ensure students remain productively engaged.

Professional Learning and Instructional Technology

According to Acree et al. (2017), the shift from traditional methods of instruction to models utilizing digital tools requires a change in the roles of teachers and an organizational change, with the need for leaders to reframe how they think about their organization and its resources. For teachers who are experienced in a traditional, whole-class direct instruction model of teaching, the integration of instructional technology may require developing new skills and strategies through professional learning (Sokal et al., 2020). Teachers within an organization have a range of abilities and roles. In a study of the skills required for teachers to effectively integrate technology, and their quest to develop a model to measure such competencies, Halverson and Graham (2019) acknowledged teachers must possess skillsets relevant to both digital instruction and traditional instruction. Additionally, they must be able to integrate the two forms of instruction in a logical, coherent, and decisive manner. Yet, Halverson and Graham (2019) observed that while there has been a significant increase in demand for online learning options, there has not been a commensurate increase in efforts to prepare teachers to meet that demand.

Dillon et al. (2019) conducted a study shedding light on the gap existing in teacher education and preparation concerning instructional technology. The authors highlight the importance of adequately preparing future teachers to effectively integrate technology into their teaching practices. They argued that while technology has become increasingly prevalent in educational settings, many teacher education programs fail to provide comprehensive training and support in this area, with no training in technology required (Dillon et al., 2019). The misalignment between teachers' skills and knowledge with the technological requirements of contemporary classrooms can negatively impact student learning. When teachers lack training in technology, a gap is created between their skills and the demands of the classroom, similar to the learning gaps experienced by students. However, when teachers have this gap, it exacerbates the learning gaps among students.

In their study, Dillon et al. (2019) examined an initiative to offer professional development opportunities for teacher educators. The primary objective of the initiative was to effectively prepare future teachers for the integration of instructional technology by enhancing the technical skills and knowledge of faculty within college and university education programs. The findings of the study noted improvements in educational faculty confidence and competence. Dillon et al. (2019) noted the program positively influenced pedagogical practices of participating educators, resulting in more effective technology integration in their teaching. Dillon et al. (2019) emphasized the need for teacher preparation programs to prioritize technology integration by providing adequate training and support to future teachers. Addressing the gap in teacher education and preparation related to instructional technology is essential for ensuring educators are equipped to meet the technological demands of modern classrooms, (Dillon et al., 2019).

Agostini (2013) conducted a case study on the implementation of a blended learning model, involving instructional technology in multiple charter schools. The study revealed educational leaders need to recognize and acknowledge different teachers have varying professional learning needs to effectively meet the demands of their job requirements. Agostini's (2013) research presented examples of leadership in blended learning charter schools recognizing the unique skill sets and knowledge gaps among teachers. Leaders in the study implemented differentiated professional learning strategies to meet the specific needs of teachers (Agostini, 2013). This approach acknowledges teachers come from varied backgrounds, possess different levels of technological proficiency, and have diverse experiences with blended learning pedagogies, reflective of student learning.

It is crucial for change initiatives, including the successful integration of instructional technology, to identify teachers' needs and invest in professional development opportunities to address those needs, while advancing the goal of improving student outcomes. Various forms of professional development for teachers encompass workshops and tailored training sessions to enhance their understanding and skills, including blended learning strategies, technology integration, online instructional methods, and effective utilization of digital tools. Learning opportunities provide teachers with targeted support and guidance to strengthen their abilities, demonstrating targeted and personalized learning is effective. Alternatively, self-paced, online courses and modules focusing on topics, such as blended learning pedagogies, online assessment, personalized learning, data-driven instruction, or specific digital tools and platforms can be effective resources for providing professional development related to instructional technology (Agostini, 2013).

Finally, with coaching and mentoring, teachers can receive individualized support from experienced educators or instructional technology specialists. This support can involve regular meetings, classroom observations, feedback sessions, and guidance on incorporating instructional technology effectively (Agostini, 2013). Targeted approaches promote professional growth and enable teachers to meet the practical requirements of their jobs in a manner aligning with their specific needs and professional goals. By tailoring professional learning opportunities for individual teachers, leaders can ensure educators receive the necessary support and resources to enhance their skills, knowledge, and confidence for providing a classroom experience with effective use of technology.

In their J*obs to be Done* theory, Arnett et al. (2018) proposed obtaining buy-in from stakeholders increases the likelihood of success for an initiative, which aligns with Papa's (2010) argument that school leaders should advocate for teacher buy-in. Papa also emphasized the benefits educational leaders can experience by considering their teachers' interests and motivations for professional learning. Papa's (2010) approach to professional development aligns with Kotter's (2012) seventh step of consolidating gains and driving further change. For instance, when teachers become aware of how technology can save time for tasks, like formative assessments or collaborative planning, they may be more open-minded and willing to engage in learning opportunities to expand their own knowledge (Acree et al., 2017). Linton (2018) added that incentives can also play a beneficial role in fostering the necessary buy-in to successfully implement a change initiative, such as compensation, stipends for attending professional development sessions, or providing release time for teachers to practice new skills and collaborate with their colleagues.

Teachers, like students, also need sufficient time and experience to construct and apply new knowledge and skills. In a 2019 study of teacher perceptions of online professional learning, Powell and Bodur (2019) observed overlapping principles inherent to social constructivism and connectivism, such as engagement, relevance, and accessing prior knowledge, apply to adult learners too, and specifically in the context of professional learning for teachers. Leaders must provide the structure and time for teachers to expand their knowledge and practice, acquire new skills, collaborate, innovate, and transfer learning, just as teachers must do this for their students.

The Importance of Collaboration

Darling-Hammond et al. (2017) analyzed 35 studies and determined when professional learning utilizes effective collaborative structures for teachers to problem-solve and learn together, it can positively contribute to student achievement. The positive relationship between teacher collaboration and improved student achievement was reinforced by the findings of Schleifer et al. (2017), noting in schools where collaboration is supported, there is higher student achievement than in schools where collaboration is less prevalent. Research conducted by Schleifer et al. revealed enhanced collaboration among teachers' benefits teachers and provides opportunities for students. Collaborative planning and assessment practices allow teachers to design more engaging and tailored instructional approaches, enhancing student engagement, motivation, and achievement. Through collaboration, teachers identify and address students' individual needs more effectively, as they gain a deeper understanding of their students' strengths, weaknesses, and learning styles (Schleifer et al., 2017).

Additionally, collaborative teacher teams were found to provide a supportive and cohesive environment for students. Teachers who worked collaboratively often shared common goals and expectations, ensuring consistency across classrooms. This consistency fostered

students' sense of belonging and continuity, promoting a positive school climate. Moreover, collaborative teams were able to identify and implement strategies for student support, such as interventions and accommodations, which benefited students with diverse learning needs.

Through collaboration, teachers can observe and engage with diverse tools, strategies, and pedagogies demonstrated and practiced by their colleagues, increasing the likelihood teachers will adapt their instruction when students require additional support or enrichment (Schleifer et al., 2017). Additionally, teachers can more readily adjust and personalize instruction in response to what students learn or fail to learn in other grades and classes. According to Schleifer et al. (2017), when teachers are given ample opportunities for collaboration, they are more inclined to modify their teaching approaches and integrate specific pedagogical practices for utilizing strategies to incorporate technology, resulting in enhanced student outcomes.

Donohoo et al. (2018) expanded on the concept of collaboration, defining it as a type of collective efficacy with the potential to enhance student outcomes, emphasizing the key factor for improvement as the presence of data-based evidence demonstrating the impact of collaborative efforts. In simpler terms, when teachers are provided with opportunities to collaborate, collectively observe, and analyze data showing positive effects, they feel empowered to make instructional adjustments that address students' needs, ultimately leading to improved outcomes (Donohoo et al., 2018).

The relationship between leadership and opportunities for collaboration is integral to learning. According to Gallos (2006), it is crucial to align the organizational structure with new initiatives. When changes are aimed at enhancing student outcomes, they are more likely to succeed if a restructuring prioritizes dedicated time for teacher collaboration. Dedicating regular time to collaborative learning communities provides a platform for peer support and ongoing

professional growth to allow teachers to enhance their skills and build confidence in learning models incorporating instructional technology and tools, such as professional learning communities (PLCs), where teachers can share ideas, best practices, and experiences related to instructional technology, (Agostini, 2013). Gallos (2006) emphasized the significance of aligning the organizational structure with new initiatives to improve student outcomes, i.e., restructuring and allocating time for teachers to collaborate. Administrators can set aside uninterrupted time for PLCs, where teachers can engage in collaborative discussions, share best practices, and engage in practicing technology integration. This time should be safeguarded from other interruptions or responsibilities. By aligning structure and prioritizing collaborative time, the chances of successfully implementing changes benefiting students are increased.

Increased opportunities for collaboration have been shown to aid in retaining experienced teachers, particularly as fewer individuals enter the teaching profession (Sutcher et al., 2016). Sutcher and colleagues' analysis of teacher shortages highlights the importance of professional learning opportunities, instructional leadership, collaboration and planning time, collegial relationships, and input in decision-making for retaining teachers. They recommended providing dedicated time for collaborative planning and increasing professional learning opportunities to attract and retain teachers (Sutcher et al., 2016). Additionally, Podolsky et al. (2019) conducted a study examining the relationship between teacher experience and student achievement. Their findings indicate a positive correlation between the two variables, suggesting teachers who remain in the profession have a positive impact on student outcomes. Thus, when teachers work in an environment which values collaboration, allocates time, and provides resources for their professional development, student educational outcomes tend to improve (Podolsky et al., 2019; Sutcher et al., 2016).

Student Outcomes

To improve student outcomes, teachers must be informed about student learning relative to academic standards. Learning models integrating instructional technology and content-related software programs offer teachers the advantage of receiving real-time feedback on student progress through dashboards. Feedback aids in identifying areas that may require reteaching or enrichment during face-to-face instruction (Wilkes et al., 2020). A study conducted by Horn et al. (2014), explored the effects of blended learning, incorporating instructional technology, at various elementary sites. The study found the utilization of targeted data on student learning, obtained through instructional technology, yielded positive outcomes for *all* students. Notably, there was significant improvement observed among low-income Hispanic students whose first language was not English. By incorporating instructional technology, teachers were able to obtain real-time data to customize instruction, positively impacting student outcomes (Horn et al., 2014).

As previously noted, learning theories of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005) include student choice and agency as key components of engagement. Bond and Bedenlier (2019) examined the interplay between students, their peers, the teacher, and the classroom environment to develop a conceptual framework surrounding the role of instructional technology. Their research emphasized the incorporation of technology in K-12 classrooms as effective for promoting student engagement. Similarly, Kundu et al. (2020) completed a qualitative study of 40 fourth-grade classrooms in India, determining improved student engagement in learning, even with limited use of instructional technology. Linton's (2018) findings echoed those of Kundu et al., revealing blended learning incorporates technology, while promoting increased student engagement. Comparatively, Collins and

Halverson (2018) observed the limitations placed on both students and teachers in more traditional teaching approaches, due to lack of choice, which strengthens Sheninger's (2014) observation that change in schools requires a culture encouraging intrinsic motivation and mastery. Incorporating adaptable instructional technology, based on students' needs, and facilitated by the teacher, can support a culture of choice and mastery, resulting in increased student engagement, while providing data about individual learning progress to students and teachers. Sheninger (2014) highlighted the potential of technology to facilitate individualized instruction, catering to the diverse needs and interests of students. The author emphasized that schools must change to remain relevant and effective. By embracing digital leadership and leveraging technology, schools can enhance student outcomes and better prepare learners for the challenges and opportunities.

Personalized Learning

While lacking a uniform definition, personalized learning can be characterized by strategies to customize learning based on individual students' needs, goals, and abilities (Shemshack & Spector, 2021). Findings from recent studies indicate instructional technology can contribute to improved achievement among students (Zheng et al., 2022). Further studies on personalized learning with technology demonstrate improved metacognitive skills (Arroyo et al., 2014), student engagement and motivation (Alamri et al., 2020), as well as non-academic skills that are critical components of 21st-century learning (Tucker, 2021). Such improvements are consistent with the use of instructional technology, allowing student control over modalities and pace. A 2022 meta-analysis study conducted by Zheng et al. (2012) determined personalized learning, which integrates technology, was more effective than traditional learning because student outcomes improve with customized learning for the unique needs of individual learners.

Blended learning, incorporating instructional technology, is an example of an instructional model in which personalized learning can occur. Consistent with social constructivism and connectivism, blended learning personalizes students' experience and expands on differentiation by centering the student rather than the teacher (Gross et al., 2018). In a research survey of teachers and students across the United States, Gross et al. found personalized learning has several key aspects across schools and organizations. First, personalized learning is learning customized for individual students' areas of strength, areas of growth, and interests. Gross et al. contend personalized learning provides students with choice in content, the atmosphere of how, when, and where learning takes place, and voice for how students share their learning. Finally, Gross et al. explained personalized learning is flexible and includes scaffolding to help students master standards to the greatest possible extent. Findings from their report also determined personalized learning as an agreed-upon method of instruction within schools and organizations, based on research about students learning through engagement and motivation, standing in contrast to more traditional modes of learning where the expectation is all students should simultaneously progress along a predetermined curriculum (Gross et al., 2018). Aligned with social constructivism (Vygotsky, 1978) blended learning prioritizes student-centered approaches and expands on differentiation.

An analysis conducted by Anthony (2019) compared high-growth blended learning classrooms with low-growth blended learning classrooms to identify the distinguishing characteristics. Anthony's research identified specific factors contributing to enhanced student learning in blended learning models. These factors included teaching practices utilizing data to inform instructional decisions and the promotion of high levels of student engagement (2019). Adaptable instructional technology tools used in a blended learning model further personalize

learning by allowing students to practice what they can do independently, while also informing teachers what students can do with support, operating in their zone of proximal development (Vygotsky, 1978). While not a replacement for individual 1:1 instruction with a tutor or teacher, the benefits of utilizing adaptive technology within a blended learning model personalize the student experience in several ways (Anthony, 2019). First, the use of adaptive technology is a means by which teachers may continually collect data about students' performance; therefore, the teacher can use the individual data to inform targeted instruction during small groups or individual conferring (Anthony, 2019). Secondly, adaptive technology engages students within their zone of proximal learning, which varies between students and across content areas (Anthony, 2019; Vygotsky, 1978). In other words, using technology for blended learning provides informative feedback to both students and teachers in real time.

As described by Tucker (2021), the station-rotation model is a blended learning approach involving dividing the class into smaller groups or stations. Each station offers a different learning activity or task, such as independent online work, small group discussions, or teacher-led instruction. Students rotate through the stations at designated intervals, allowing for a combination of online and face-to-face interactions. The station model promotes personalized learning, student engagement, and differentiated instruction by providing students with a variety of learning experiences and opportunities for individualized support. Students learn from the feedback provided in small groups by peers, teachers, and the adaptive instructional technology with which they engage (Tucker, 2021). The teacher can then utilize that data to reinforce individual learning goals (Public Impact & Clayton Christensen Institute, 2018; Wilkes et al., 2020). The station-rotation model differs from other methods of instructional technology integration and with some models of blended learning, such as a flipped classroom, where

students work on digital platforms outside the classroom. By using the data in real-time, teachers can more quickly provide intervention and adapt lessons to students' zones of proximal development (Public Impact & Clayton Christensen Institute, 2018).

In addition to real-time data informing instruction, a 2014 study by Daley et al. found data displayed to students in the formative assessment portions of blended learning benefitted students and teachers by making the students' help-seeking behaviors more efficient. Daley et al. shared that students were able to identify where they needed help and how to seek the assistance required. The findings of Daley et al. are consistent with the improved metacognitive skills observed by Arroyo et al. (2014). Blended learning models incorporate instructional technology and lend themselves to approaches in alignment with the characteristics of social constructivism and connectivism.

Summary

The existing literature suggests integrating instructional technology at the elementary level can lead to personalized growth opportunities and increased student engagement, resulting in enhanced learning outcomes. However, for successful implementation, it is essential to have committed leadership and educators who are aligned with the organization's mission, as well as dedicated time for collaboration and professional support. This study sought to deepen and expand the understanding of third-grade through fifth-grade general education teachers' perceptions of the use of instructional technology in teaching and for student learning (Arnett, 2021). For teachers to effectively engage in practices aimed at improving student achievement, such as the use of instructional technology to enhance learning, district and site leaders must prioritize providing time and meaningful support for teachers to collaborate, collect and analyze data to inform their practices.

CHAPTER 3: METHODOLOGY

Chapter 3 describes the methodology used to conduct the qualitative narrative inquiry, which details the process of data collection and analysis, while explaining the rationale of participants' narratives for data. The purpose of this qualitative narrative inquiry was to understand the experiences of third-grade through fifth-grade teachers regarding the implementation of instructional technology in their classrooms. According to Bloomberg and Volpe (2018), narratives reflect the lived experiences of individuals, as expressed in their stories, and must be viewed within a participant's social and cultural context rather than independently. Additionally, according to Connelly and Clandinin (1990),

> The study of narrative is the study of the ways humans experience the world. This general concept is refined into the view that education and educational research is the construction and reconstruction of personal and social stories; learners, teachers, and researchers are storytellers and characters in their own and others' stories. (p. 2)

The narrative inquiry methodology aligned with the theoretical frameworks for this study. Just as narrative inquiry relies on the construction of stories in social and cultural contexts, the theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005) rely on the construction of meaning within the context of learning with and from others.

Disparate attitudes about the application of instructional technology can impact teaching and student learning favorably or contribute to widening existing negative achievement gaps for students, particularly on the heels of the COVID-19 pandemic (Alanoglu et al., 2022; Nation's Report Card, 2022). In their study for determining uses of instructional technology during the time of COVID-19 and distance learning, Dincher and Wagner (2021) concluded the "adoption and implementation of (web-based) educational technologies crucially depend on teachers'

willingness to acquire the necessary skills and an open mindset to use them" (p. 408). A narrative inquiry into teachers' perspectives elucidated the attitudes and mindsets of participants regarding the implementation of instructional technology.

To better understand the lived experiences of third-grade through fifth-grade public school teachers' instructional technology perceptions, participating teachers were asked: Research Question 1: How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology? Research Question 2: How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?

Utilizing Kotter's (2012) eight-step process for change as a conceptual framework with the overlapping lenses of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005) as theoretical frameworks, this qualitative narrative inquiry examined the lived experiences and perceptions of instructional technology by participants, as revealed by the analysis of data generated from 1:1 semi-structured interviews. In addition to providing participants the opportunity to share their perspectives, according to Saldana (2011), narrative inquiry allows readers to develop personal meaning in relation to themselves and the social world. The reader reflects on the personal meaning derived from the piece and the connection between the narrative, themselves, and the social world. The reader's construction of meaning as it relates to themselves, others, and the social world is also aligned with the theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005).

It is essential to acknowledge potential bias and retain reflexive thinking when collecting and analyzing data (Creswell & Guetterman, 2019). While not currently employed at the study

site, the researcher was familiar with the site as a former employee and was aware of some prospective participants through her role as a former employee. The researcher was aware of and acknowledged potential bias as it related to her former positions within the school district. The methodology chosen provided for this familiarity and advised that researchers "listen to participants tell their stories in the inquiry, we, as inquirers, need to pay close attention to who we are in the inquiry and to understand we are part of the storied landscapes we are studying" (Clandinin, 2013, p. 24). This qualitative narrative inquiry consists of an in-depth thematic analysis of data collected from one-on-one interviews with nine public elementary school teachers from grades 3 through 5. A limited sample size enabled the researcher to gain a comprehensive understanding within a specific social and cultural context (Subedi, 2021).

Semi-structured interviews were designed with open-ended questions and virtually conducted in one-on-one settings during 45-minute intervals. Once interviews were conducted, transcribed, restoried, and member-checked, the data was analyzed using in vivo coding and thematic analysis as described by Saldana (2008). This approach allowed the researcher to examine meaningful patterns revealed through the participants' experiences.

Site Information and Demographics

The site for this study was an elementary public school district located in a suburban area of Northern California. The research participants were teachers employed at one of four possible elementary sites who volunteer to be interviewed for the study. According to the California Department of Education (2021), in the 2020-2021 academic year, the district had an enrollment of approximately 3,500 students in grades K-8th, with 372 students enrolled in third grade, 371 enrolled in fourth-grade, and 387 in fifth-grade. The district employed 164 teachers on a full-time basis (California Department of Education, 2021). The district's strategic technology plan

was updated in July of 2022 and establishes goals and timelines for the integration of educational technology through June 2025. The goals of the technology plan are aligned with International Standards for Technology Education (ISTE) (2022) for students, educators, and educational leaders. The ISTE standards are a set of guidelines and benchmarks outlining what students, educators, and education leaders should know and be able to do with technology in education. These standards provide a framework for integrating technology effectively and meaningfully in the learning environment to provide a means for teachers and students to utilize technology to facilitate the integration of 21st-century skills, such as critical thinking, communication, collaboration, and creativity, while maintaining strong academic performance in traditional subjects (Framework for 21st Century Learning, 2019; Tucker, 2021).

The researcher employed qualitative data collection methods after receiving a formal approval from the University of New England's Institutional Review Board (IRB), in addition to approval from the dissertation committee and the sample school district. Site approval for the study was received and authorized with a letter of permission from the Superintendent of the proposed district.

Participants and Sampling

The population for this study consisted of volunteer upper-elementary public school general education teachers from third, fourth, and fifth-grade classrooms. To ensure consistency in professional training and standards among the selected population, potential participants each held an active multiple-subject teaching credential from the California Commission on Teacher Credentialing. This population was selected in alignment with the purpose of the study because participants were employed in a district with a technology plan revised within the last 5 years, had 1:1 access to instructional technology devices in the classroom, and, during distance

learning, likely became more adept at integrating technology for teaching and learning (Engzell et al., 2021). Additionally, this population of teachers continued to integrate instructional technology into their practices and student learning experiences upon a return to in-person instruction. Selecting multiple teachers at each grade level allowed for a range of perspectives to be examined and will reduce the possibility of one teacher's experience at that grade level reflecting the experience of other teachers at the same grade level. Participants for this narrative inquiry were volunteers from a population at the study site schools who were age 18-years or older and met the following criteria:

1.) Each was a third, fourth, or fifth-grade general education teacher.
2.) Each held an active multiple-subject teaching credential from the California Commission on Teacher Credentialing.
3.) Each was employed as the teacher of record with the study site for the 2023-2024 academic year.
4.) Each volunteer had at least 3 years of teaching experience prior to the 2023-2024 academic year.

The researcher identified participants by searching for the email addresses of all third, fourth, and fifth-grade teachers on the public website of the proposed district. According to the publicly available district technology plan, teachers and students at each site were provided with access to devices and instructional technology, including, but not limited to, laptops, Chromebooks, display monitors, and internet subscriptions to applications. Teachers were provided with district-issued laptops used for instructional purposes, and students were each assigned a Chromebook for the academic year.

Upon receiving written permission from the Superintendent and UNE IRB, the researcher invited participants by email (Appendix A) to complete an interview via Zoom, following the protocol included in the appendix (Appendix B). It was assumed each class consists of a diverse population of learners, including, students for whom English is a second language and/or students with special needs and whose academic program is governed by an Individualized Education Plan (IEP). Having diverse populations in the classrooms of prospective participants allowed the participants to reflect on the use of instructional technology to meet the varied needs of students.

Diversity within the classrooms of participants is also consistent with Siemen's (2005) description of the principles and values of connectivism as inclusive of diverse opinions, connecting resources and information through networks and devices, acknowledging the unknown, having the curiosity to acquire more knowledge, and having the ability to make decisions as a learning process. Furthermore, according to Arnett (2021), by leveraging instructional technology for personalization, collaboration, differentiation, accessibility, assessment, and feedback, educators can better address the diverse needs of learners, fostering an inclusive and effective learning environment. The presence of diverse student populations in classrooms provided prospective participants with an opportunity to consider how instructional technology can be utilized to meet the diverse needs of students.

Participants were recruited through purposeful sampling and criterion sampling from invitees who self-identified as meeting the conditions of third, fourth, or fifth-grade teachers of a general education classroom at the school district chosen as the study site. According to Ravitch and Carl (2021), purposeful sampling, or purposive sampling, is often used in qualitative

research when participants have knowledge of, and experience related to the topic of study and the study's guiding research questions.

Instrumentation and Data Collection

A qualitative approach to this study allowed the researcher to examine the current perspectives and experiences of this subpopulation of public, upper-elementary school teachers vis-à-vis instructional technology. After approval of the Institutional Review Board (IRB), the researcher e-mailed the superintendent of the district and attached the IRB exemption document (Appendix D) and the participant information sheet (Appendix C).

Next, the researcher contacted potential participants from the population of teachers who met the criteria by emailing the third-grade, fourth-grade, and fifth-grade teachers at their publicly available email address. The recruitment email (Appendix A) included a copy of the UNE Participant Information Sheet (Appendix C). The participant information sheet included an overview of the study, the purpose of the study, the benefits of participating in the study, and the intention of the researcher to maintain privacy and confidentiality. Interested participants were asked to email the researcher at her University of New England (UNE) email address to agree to participate in the study. The researcher initially sought to recruit 12 participants consisting of a mix of third-grade, fourth-grade, and fifth-grade teachers. Four participants responded to the initial e-mail. In an attempt to recruit more participants, the researcher resent the recruitment e-mail twice more, and successfully recruited one additional participant, for a total of five participants.

Once five participants were recruited, the researcher individually emailed each participant to notify them of their selection to participate in the study. This email consisted of the information included in the Participant Introduction E-Mail (Appendix A) and also included a

link to schedule a 45-minute Zoom appointment, during which the semi-structured interviews occurred. Participants were assured they could withdraw their permission at any time during the project until the master list was destroyed without any penalty. Of the five participants, all five completed the study and none requested withdrawal.

Data was collected by conducting semi-structured interviews with each participant. According to Creswell and Guetterman (2019), semi-structured interviews using open-ended questions allow participants to describe their experiences and perspectives. The researcher collected the data during interviews conducted through Zoom meetings. Archibald et al. (2019) describe Zoom as "a collaborative, cloud-based video-conferencing service offering features including online meetings, group messaging services, and secure recording of sessions" (para. 4).

Participants were emailed a password-protected Zoom link for the interview and afforded the opportunity to participate in a private location where they are most comfortable. Before the start of the interview, the researcher confirmed the participant received the Participant Information Sheet and invited them to ask any questions they may have. Participants were reminded they would be recorded and were provided with the opportunity to turn their camera off. The researcher reviewed the purpose of the study and asked if the participant had questions. The researcher answered any questions the participant may have had, and if none, the researcher proceeded with the interview.

The interviews were audio recorded in Zoom and transcribed using the auto transcription feature available within Zoom. The interview questions included in the appendix (Appendix B) were structured to enable participants to describe their utilization or absence of instructional technology. Instructional technology was defined as "the practice of enhancing learning and

performance through the creation, utilization, and management of suitable, technological processes and resources" (Januszewski & Molenda, 2008, p. 1). The interview questions were designed with the support of the dissertation committee and field tested with a convenience sampling of two K-12 educators to occur prior to the commencement of the study. Field testing the interview questions allowed the researcher to revise interview questions, if necessary, prior to interviewing participants (Bloomberg & Volpe, 2019). The open-ended nature of the questions proved sufficient for providing participants the opportunity to share their insights during the field-test. Bloomberg and Volpe (2019) indicate reasons for eliminating certain questions after field testing, such as ambiguity, in which the questions are unclear or open to multiple interpretations, and irrelevance or when the questions do not relate to the research objectives or the target population. Other reasons for eliminating questions after field testing include response bias, redundancy, and ineffectiveness, where the questions do not elicit meaningful or useful data (Bloomberg & Volpe, 2019). Upon field testing, the researcher determined the interview questions to be satisfactory and not in need of revision or elimination.

Creswell and Guetterman (2019) described the nature of a qualitative interview as the researcher asking open-ended, general questions and elucidating the participants' experience, with the researcher transcribing the data for analysis. According to Clandinin (2013), "[a]s narrative inquirers, we must pay close attention to these interwoven processes of memory and imagination, not only for us, but also as we live alongside and engage in listening to the stories of participants" (p. 196). Bloomberg and Volpe (2018) noted narrative research incorporates multiple data sources, which allow the researcher to restory the information into a narrative chronology, providing meaning and context. Thus, in addition to transcribing the interviews, field notes were taken by the researcher during the interview, recording physical reactions such

as facial responses and tone of voice. These field notes served as a second source of instrumentation and provided additional data and insight into the participants' experiences and perspectives (Saldana, 2021).

Clandinin (2013) noted the importance of retelling in qualitative narrative inquiry and described it as a process in which the researcher comes alongside the participant by inquiring and engaging them as they relive their story. The format of semi-structured interviews with open-ended questions facilitated this process. Interviews were transcribed through Zoom's auto-transcription feature. Once transcribed, the content of the interview was restoried by the researcher, utilizing the characteristics of narrative to retell participants' use of instructional technology story in teaching and student learning. Following the interview, after responses were transcribed and restoried, participants were provided the restoried narrative by e-mail to member-check for accuracy and integrity (Creswell & Geutterman, 2019). Participants were provided with 5 business days to reply, after which the transcripts were considered accurate. If a participant wished to amend their transcript after 5 business days, the researcher made the changes accordingly and documented the request and the change in the field notes.

During the process of restorying, identifiable information including the interview transcripts and master list were stored on a password-protected computer, accessible only by the researcher. To ensure participants' identities were protected, the researcher substituted pseudonyms for participants' names to de-identify information posing a risk or potential harm to participants (Creswell & Poth, 2018). Individual privacy was maintained in all published and written data resulting from the study.

Data Analysis

This study included participant responses generated and collected during semi-structured interviews consisting of open-ended questions. Following participant interviews, the researcher conducted data analysis by coding the information from the interview. The researcher examined and manually coded the data to classify and organize the information from the interview by color-coding repetitive participants' phrases or words (Saldana, 2008). Similar words and phrases were grouped together to help identify common themes. Next, using the narrative qualities of setting, characters, action, problem, and resolution, the researcher retold participants' stories in the researcher's own words by organizing key codes into narrative sequence (Creswell & Guetterman, 2019).

The restoried narratives were sent to participants for member-checking to ensure the personal stories are accurately represented, allowing for the co-construction of meaning (Connelly & Clandinin, 1990). Participants had 5calendar days to amend the restoried narratives, after which point the restoried narratives were considered accurate. After 5 calendar days, if any requests to change the narrative were made, the researcher met with the participant to explore the nature of the changes, restory the narrative, and document the changes in field notes.

Limitations, Delimitations, and Ethical Issues

Qualitative narrative inquiry studies have inherent limitations, delimitations, and ethical issues (Bloomberg and Volpe, 2018). A notable constraint to the narrative inquiry methodology arises from the subjectivity embedded in the interpretation of qualitative data, where researchers' biases and viewpoints can influence the analysis. Additionally, the often small and non-random sample sizes in narrative studies restrict the generalizability of findings. Delimitations, or setting predefined study boundaries, may inadvertently exclude certain voices, potentially limiting the

overall comprehensiveness of the narrative. Ethical challenges emerge in ensuring participant confidentiality and obtaining informed consent, particularly when dealing with personal and sensitive narratives. Researchers must navigate the fine line between extracting valuable insights and safeguarding the well-being and privacy of participants, underscoring the importance of a conscientious and transparent approach to ethical considerations in qualitative narrative inquiry (Bloomberg and Volpe, 2018). Multiple limitations, delimitations, and ethical issues in this qualitative narrative study were identified.

Limitations

According to Bloomberg and Volpe (2018), "[l]imitations represent the inherent weaknesses or flaws given the research design. Qualitative limitations are threats to transferability, credibility, confirmability, and dependability" (p. 8). The approach of narrative inquiry was an inherent limitation. Rather than definitive conclusions, narrative inquiry provides meaning and insight into the experiences and perspectives of participants (Bloomberg & Volpe, 2018). Another limitation of this study related to the narrative inquiry approach was the small sample size, with specific criteria related to demographics, setting, and personnel, resulting in potentially limited transferability of the data beyond the district in which the study will occur. An additional limitation to the generalizability of the study was the potentially varied length of professional experience among the participants. The researcher's status as a former employee of the district and a current consultant to an educational technology organization were limitations of this inquiry. Finally, the potential for participants who are also former colleagues of the researcher placed a limitation on the inquiry since the responses provided by these participants may have been what participants assumed the researcher wants to hear rather than what reflected their own experiences.

Delimitations

This study had several delimitations. Firstly, the parameters of the study included eligibility criteria for participation. The criteria required participants to be third, fourth, or fifth-grade general education teachers. Each participant held an active multiple-subject teaching credential from the California Commission on Teacher Credentialing, and each was employed as the teacher of record with the study site for the 2023-2024 academic year. According to Bloomberg and Volpe (2018), the use of pseudonyms to protect confidentiality can be considered a delimitation by hindering rapport during an interview or interfering with data verification. The use of a master list mitigated pseudonyms as a delimitation in this study.

Bloomberg and Volpe (2018) also highlight that the pre-determined nature of research and interview questions can limit the exploration of unexpected or emergent themes during the data collection phase. By focusing on specific predetermined questions, even when flexible and open-ended, researchers may inadvertently overlook valuable insights that lie outside the scope of their initial inquiry. This can narrow the range of perspectives and experiences captured in the study, potentially leading to less comprehensive and nuanced findings (Bloomberg and Volpe, 2018).

Additionally, the wording and framing of research and interview questions can subconsciously influence participants' responses, potentially skewing the data and introducing bias (Bloomberg & Volpe, 2018). This is particularly relevant in narrative inquiry studies, such as this one, where researchers often seek to understand participants' personal experiences and subjective interpretations. Leading or suggestive questions can prompt participants to provide tailored responses that align with the researcher's expectations, rather than providing their genuine and unfiltered perspectives (Bloomberg & Volpe, 2018).

To address these delimitations, Bloomberg and Volpe (2018) recommend adopting a flexible and iterative approach to data collection in qualitative narrative inquiry studies and suggest that researchers should remain open to exploring new directions and emerging themes that arise during the interview process, allowing for a more organic and comprehensive understanding of the participants' experiences. This study intentionally included open-ended questions and allowed for participants to elaborate on their answers, guided by prompts from the researcher during the interview.

The use of Kotter's (2012) 8-step guiding principles for change as the conceptual framework, along with social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005) as the theoretical framework, were acknowledged as delimitations to this inquiry. Finally, another delimitation to this narrative inquiry was that the results should not be used to make a broader statement about similar populations (Connelly & Clandinin, 1990). The nature of narrative inquiry, with its focus on specific individuals and experiences, further limited the possibility of drawing broader conclusions. While the study provided valuable insights into the experiences of the participants, these findings should not be extrapolated to wider contexts or populations.

Ethical Issues

During this study, the researcher adhered to the principles described in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). The Belmont Report outlines basic ethical principles and guidelines that incorporate moral convictions in research studies relevant to ethical considerations. The three ethical principles identified by the Belmont Report are respect for persons, beneficence, and justice (1979). To address potential ethical issues and incorporate the principles and guidelines offered by the Belmont

Report, this narrative inquiry utilized UNE's Participant Information Sheet (Appendix C). Prospective participants were provided the following information: (a) the explanation of procedures, (b) a description of risks, if any, reasonably to be expected as a participant in the study, (c) a description of benefits, if any, reasonably to be expected as a participant in the study (d) an instruction that participants were free to withdraw from the study at any time during the research process until the master list was destroyed. Participants were provided with the UNE Participant Information Sheet and the opportunity to ask questions prior to scheduling the semi-structured interview. Before conducting the interview, participants verbally acknowledged they were willing to be recorded and participate voluntarily.

Confidentiality was an essential component of this study. For participants to feel comfortable being transparent, the researcher informed participants that pseudonyms would be used to minimize risk and protect privacy (Appendix C). Any data obtained during the interview was kept confidential and used for the sole purpose of the study. All recordings were deleted after verification of transcripts. Field notes will be destroyed and transcriptions will be deleted 3 years after the completion of the study. The confidentiality of participants was protected throughout the course of the study, with names and identifying information replaced with pseudonyms on all any material generated from the interviews. Names, emails, transcriptions, and field notes were stored on a password-protected computer, accessible only by the researcher.

Trustworthiness

Merriam and Tisdell (2016) ascertain the trustworthiness of a qualitative study relies on what the researcher sees and hears during the interview process. According to Ravitch and Carl (2021), trustworthiness is established through informed consent between the researcher and participants, occurring at the outset of the research and continuing throughout and after the study.

Since the researcher is a former employee of the district in which the study is being conducted, trustworthiness was particularly significant as it relates to relationships with former colleagues within the organization and generating meaningful data. Components of trustworthiness include credibility, transferability, validity, and confirmability (Ravitch & Carl, 2021).

Credibility

According to Bloomberg and Volpe (2018), "Establishing credibility means that you have engaged in the systematic search for rival or competing explanations and interpretations (p. 12). To ensure credibility, the researcher made a concerted effort to acknowledge and remove bias and capture participants' stories with accuracy. Furthermore, participant validation occurred through member-checking (Ravitch & Carl, 2021). By sharing restoried narratives with participants and providing the opportunity for revision, the researcher validated participants' responses were not unduly influenced or misinterpreted by the researcher. The researcher also continued to enhance credibility by reviewing sources throughout the study, especially because the topic is current, and the literature related to instructional technology is expanding, with publications continually contributing to the literature.

Transferability

According to Ravitch and Carl (2021), the transferability of a study is the manner in which the process and findings of qualitative studies may be relevant or transferable to other studies. Given the specific criteria and characteristics of the study site, the level to which the findings of this study are transferable will vary depending upon factors and conditions present in other school districts and sites, including financial resources, demographics, experience levels of teachers, and access to educational technology, to name a few. By examining the narratives through the theoretical lenses of social constructivism (Vygotsky, 1978), and connectivism

(2005), the themes revealed in the literature and in the data generated from the interviews may result in findings useful to similar districts by provide direction on the conditions leading to effective use of instructional technology. Triangulation of data gathered from the literature, semi-structured interviews, field notes, and member-checking supported the findings of this narrative inquiry.

Dependability

Qualitative data collection methods are required to answer the research questions for this narrative inquiry. To ensure dependability, the interview questions were field-tested with a convenience sampling of two K-5 educators prior to participant interviews. The data for the study was primarily generated through the instruments of semi-structured interviews, enhanced by field notes. Ravitch and Carl (2021) note, "[b]y keeping the research questions at the center of your study, you allow for methods to emerge inductively as data are collected and analyzed" (p.159). Interview questions were open-ended in nature, providing the opportunity for participants to share their experiences and perspectives. Member checking ensured the researcher's influence was not unduly applied to participants' narratives. Triangulating the data generated from the interviews with field notes enhanced the dependability of the narratives.

Reflexivity, as defined by Ravitch and Carl (2021), refers to the critical self-awareness and introspection researchers engage in throughout the research process. It involves acknowledging and examining one's own assumptions, biases, and subjective influences that may shape the interpretation of data and the construction of knowledge. Reflexivity encourages researchers to reflect on their own positionality, values, and experiences, recognizing how these factors may influence their perspectives and findings. By practicing reflexivity, researchers aim to enhance the transparency, rigor, and objectivity of their research while also recognizing the

subjective nature of knowledge production (Ravitch & Carl, 2021). As a former employee and colleague of potential participants, it was essential for the researcher to acknowledge and mitigate any potential bias. Reflexivity was accomplished by dialoguing with critical thought partners and attuning to reflexivity regarding the researcher's positioning as a potential former colleague.

Confirmability

In qualitative research, confirmability is achieved when other researchers achieve similar findings with comparable studies (Creswell & Guetterman, 2019). Member checking is described by Ravitch and Carl (2021) as participant validation to ensure accurate transcription of data collected during interviews and facilitate confirmability. The member check procedure ensured the coded and restoried narratives accurately depicted the narrative of the participants. Participants were provided a copy of the restoried narratives and given five calendar days to respond by email with any changes. If a participant wished to make changes following the five-day period, the researcher made the changes accordingly and documented the timing of the changes in field notes related to that participant. Following the member-checking process, coding the data generated from interviews allowed the themes to emerge. The researcher continued to utilize reflexivity to minimize potential bias which could influence the data.

Summary

Chapter 3 provided the methodology for this qualitative narrative inquiry, which examined the perceptions and experiences of third, fourth, and fifth-grade public school teachers with instructional technology by providing detailed qualitative data generated from semi-structured interviews consisting of open-ended questions. High ethical standards were maintained throughout the study, with careful consideration given to the findings' confidentiality,

validity, and trustworthiness. Chapter 4 demonstrates the methodology described in Chapter 3 was followed and examines the results of the research.

CHAPTER 4: RESULTS

The purpose of this qualitative narrative inquiry was to understand the experiences of third-grade through fifth-grade teachers' use of instructional technology in their teaching practice and for student learning. The two research questions guiding this narrative inquiry were:

Research Question 1: How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology?

Research Question 2: How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?

These research questions formulated the basis of the open-ended, semi-structured questions, which provided participants with a platform to share their instructional technology experiences as well as opportunities for the researcher to probe answers.

Participants for the study were self-selected, via purposeful criterion sampling from a pool of invitees who fulfilled the study criteria of third, fourth, or fifth-grade teachers in general education classrooms within the selected school district for the study. As outlined by Ravitch and Carl (2021), purposeful sampling is frequently employed in qualitative research when participants possess relevant knowledge and experience pertaining to the study's subject matter and its overarching research inquiries. Upon receiving approval from the University of New England's (UNE) Institutional Review Board (IRB), the researcher sent a recruitment email from her password-protected UNE email account to prospective participants at their publicly available email addresses, listed on the study site's website. Initially, four volunteers who met the criteria responded, agreeing to participate in the study. One week after sending the initial email, the

researcher sent an identical email to the same group of prospective participants. One additional volunteer agreed to participate in the study. A third recruitment email was sent 2 weeks after the initial email, however, no new volunteers agreed to participate.

While the number of participants was below the researcher's previously noted intention to recruit a minimum of six participants, narrative research is concerned with the depth of understanding rather than the breadth of participants and tends to involve a smaller number of participants than quantitative research methods (Clandinin & Connelly, 2000). The sample size of five participants allowed the researcher to deeply explore the unique experiences and perspectives of each participant. Clandinin and Connelly (2020) refer to saturation as the point in research where collecting additional data or participants does not lead to significantly new insights or information. They acknowledge the saturation point can be achieved through iterative data collection and analysis, often involving repeated engagement with participants' stories and the emergence of common themes or patterns. Thus, rather than attempting to recruit a larger number of participants, the researcher determined the five participants were sufficient to reach saturation for this narrative inquiry. Upon agreeing to be interviewed, each participant was emailed a hyperlink, by which to schedule a virtual interview at a time and location of their choosing. Interviews were conducted using Zoom videoconferencing, with the auto-transcription feature enabled.

The 1:1 semi-structured interviews were conducted over a period of fourteen days. Interviews lasted between 45-55 minutes and allowed participants to provide a detailed account of their experiences using instructional technology in their teaching practice. Each interview was transcribed using the auto-transcription feature in Zoom. Participants were informed of the

option to leave their camera off during the interview and that they could leave the study at any time, until identifiable data had been removed and the master list was destroyed.

Following the completion of the interviews, the transcripts were subjected to a restorying process that closely aligned with the three dimensions of narrative writing, as delineated by Clandinin and Connelly (2000): time, place, and social interactions. This restorying procedure illuminated recurring themes woven throughout the narratives provided by the participants. According to Creswell and Poth (2018), analysis of these collective experiences within an institutional context can reveal patterns that might stimulate change.

Analysis Method

The data analysis process for this narrative inquiry involved two main steps: restorying and coding. During the restorying phase, the participants' stories were collected from interviews and field notes, and then transformed into individual narratives. The restoried narratives included paraphrasing in addition to direct quotes from the participants.

Narratives

According to Creswell and Poth (2018), in qualitative research, restoried narratives play a crucial role in serving as valuable data for the inquiry process. Restorying is the process of reshaping participants' original stories into structured narratives that highlight core components of time, place, plot, and scene. The reshaping allows researchers to deeply analyze and retell the narratives in an organized manner. Engaging in restorying enables researchers to extract the depth of participants' experiences and recognize recurring themes and patterns in the participants’ stories. These refined narratives become valuable data (Creswell & Poth, 2018). The restoried narratives provided a deeper understanding of participants' perspectives and served

as a foundation for generating meaningful insights and contributions to the overall findings of qualitative inquiry.

The restoried narratives were emailed to each participant for member-checking to ensure the accuracy of their portrayed personal stories. Participants were asked to notify the researcher of any revisions within 5 days. Within the designated 5-day period, upon receiving the re-storied narrative, one participant among the five replied by email, requesting a minor revision to the restoried narrative. The researcher promptly implemented the requested adjustment, and the revised narrative was subsequently provided to the participant for member checking. There were no additional revision requests. Three participants responded by email, proactively approving the restoried narrative as it was initially written. One participant did not respond, thereby accepting the restoried narrative as accurate. Following the member-checking process, the researcher manually coded the narratives by reading through them and color-coding themes. All identifying information was removed and destroyed during the restorying process and pseudonyms were assigned to protect participants' identities.

Presentation of Results and Findings

Using a narrative inquiry methodology, the participants in this study shared their instructional technology experiences within the context of teaching and learning. Sharing experiences of an organization can lead to identifying patterns that may serve as areas of focus for initiating change (Creswell & Poth, 2018). A three-dimensional space approach, proposed by Clandinin and Connelly (2000), serves as a valuable tool in qualitative research for analyzing lived experiences. This approach is employed in narrative research to represent and gain insights into individuals' experiences and perceptions. The three-dimensional space approach consists of three dimensions that helped the researcher analyze and interpret the narratives and experiences

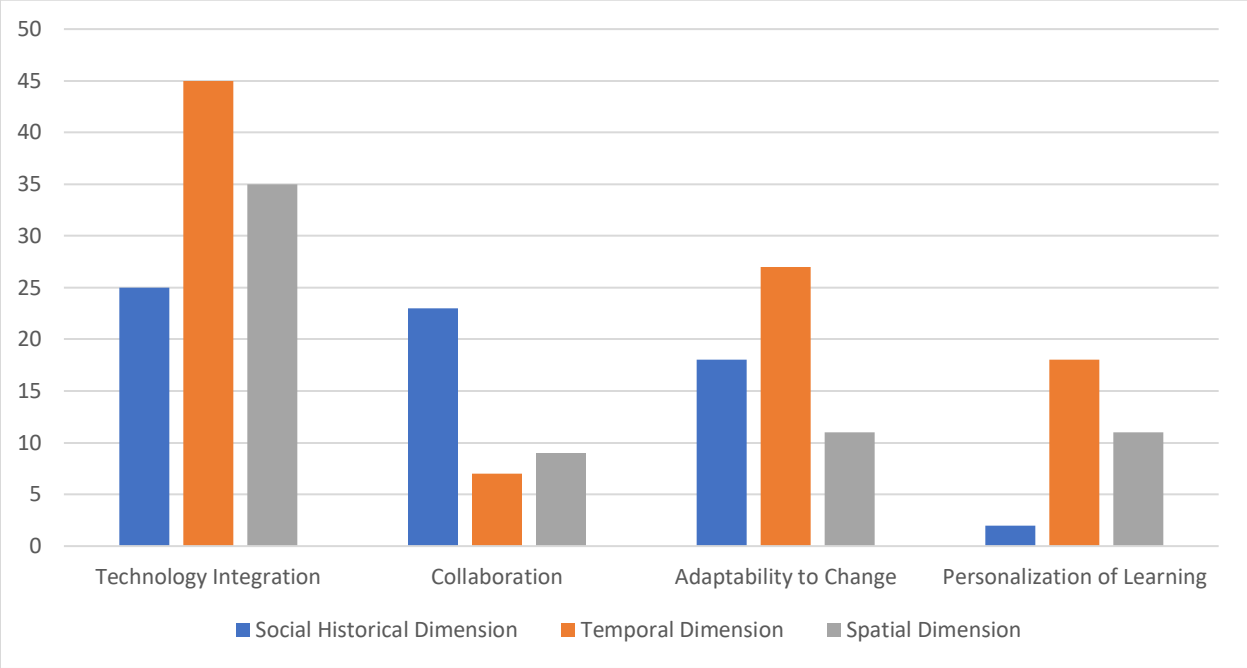
of participants: social-historical dimension, also referred to as place; the temporal dimension, also referred to as time; and the spatial dimension, also referred to as space (Clandinin & Connelly, 2000).

The social-historical dimension focuses on the context in which the experiences occur, such as the cultural, institutional, and societal factors shaping individuals' lives and experiences. Understanding the historical context is crucial to grasping how past events influence present experiences and which shape individuals' perspectives and actions. The temporal dimension involves the examination of experiences and narratives over time. It considers how experiences unfold, evolve, and change across various stages or moments. Researchers may explore the past, present, and future orientations of participants' experiences, examining how their narratives are influenced by past events and how they envision their future.

The spatial dimension addresses the physical and emotional spaces in which experiences occur. Physical environments may include classrooms, homes, workplaces, or communities, as well as individuals' emotional and psychological spaces. Researchers analyze how the physical and emotional spaces intersect and influence individuals' experiences and perspectives to gain a comprehensive and nuanced understanding of individuals' lived experiences related to instructional technology. This approach allowed the researcher to explore the complexity and richness of participants’ experiences within their broader social and historical contexts, considering how time, place, and social factors shape, and are shaped by, individuals' stories (Clandinin & Connelly, 2000).

Figure 1

Frequency of Themes in Findings by Dimension



Note. A three-dimensional space approach serves as a tool for analyzing lived experiences. This approach consists of three dimensions that helped the researcher analyze and interpret the narratives and experiences of participants: social-historical dimension, also referred to as place; the temporal dimension, also referred to as time; and the spatial dimension, also referred to as space. Adapted from *Narrative Inquiry: Experience and Story in Qualitative Research*, by Clandinin, D. J. & Connelly, F. M., Jossey-Bass, Inc., 2000.

Narratives

Once the interviews were conducted, the transcripts were restoried with close attention to Clandinin and Connelly's (2000) three dimensions of narrative writing; time, place, and social interactions. To assure the accuracy and credibility of the data, each participant was emailed the

transcripts from their interview, along with the restoried narrative for member-checking. Following the member-checking, the researcher organized and categorized the data from each narrative into plots that emerged in response to the main research questions, incorporating pseudonyms to protect the identity of participants. Further, this process considered how time, place, and social factors influence and are influenced by individuals' stories (Clandinin & Connelly, 2000).

Denise

Denise, a 20-year veteran teacher, was teaching third-grade when the interview was conducted, described herself as someone who utilized instructional technology thoughtfully and regularly. Although Denise noted technology has become an essential part of her teaching practice, she also stated the ease of access to devices creates the potential for students to spend more time on screens than previous generations, the ramifications of which are unknown. She shared how technology enhances her instruction, fosters student engagement, and provides valuable data for targeted interventions. Describing her path to embracing instructional technology as challenging, but beneficial. Denise related, "while there are hurdles, the benefits far outweigh the challenges." Given the utility with which instructional technology allows for collaboration between colleagues, personalized learning opportunities, and time-saving organizational tools that facilitate planning and communication, Denise shared her plans to continue leveraging evolving instructional technology to create an engaging and effective learning environment for her students as instructional technology becomes increasingly accessible.

The Social-Historical Dimension. Illustrating how social interactions and collaboration have played a role in her use of instructional technology, Denise shared that colleagues actively

share their experiences and best practices regarding integrating technology. She has attended professional development workshops and conferences on instructional technology, learning about various digital tools and how to incorporate them effectively. When speaking about the benefits of learning alongside and collaborating with her colleagues, Denise stated:

> The exchange of ideas with other teachers helps my understanding of how to use technology to facilitate learning, rather than just as an add-on. My use of technology goes beyond the classroom with lesson plans, and our grade-level team plans online using Google Docs and Google Classroom. As an example, we've already looked at the first two weeks of [lesson plans from] last year, pulled those up, and are planning now for the upcoming year. We make changes to them, but it's really easy that we can all be looking at that live document together and this has streamlined our collaboration and made it easier to share and access materials.

Denise noted with time and help from colleagues, she has gained more confidence with technological skills, becoming more comfortable experimenting with various applications and online platforms, creating things like interactive quizzes, and encouraging her students to collaborate on projects, fostering a sense of teamwork.

Reflecting on her growth as an educator with an evolving use of instructional technology, Denise described her journey as one shaped by her willingness to adapt and also by the resources available and the support derived from engaging with a community of educators:

> I do stick with it and figure it out, but it's not quite as intuitive for me as, you know, for the younger teachers just whipping stuff together faster, I think. But I mean, it's part of our world. I've always been one that kind of pushes through and makes myself figure it out.

The Temporal Dimension. Denise observed throughout her teaching career, her use of instructional technology has undergone a significant evolution. Earlier in her career, when she had begun teaching at a different school with only a few computers in the shared computer lab, her integration of technology had been minimal. She used educational software and interactive activities sporadically, mainly as a supplementary tool to complement traditional teaching methods. During that time, the students were intrigued by the novelty of using computers, but the limited access prevented them from fully exploring its potential as an instructional tool. Denise shared that, with time, the available technology improved. Each classroom became better equipped with a projector, monitors, and the school implemented a learning management system (LMS) and the 1:1 ratio of students to devices in the classroom increased accessibility.

Technology became an even more integral part of Denise's instructional day with the COVID-19 pandemic, "I think it made me more proficient for sure. I think, since I am on the older end of the teaching profession at this point, and we were just forced to rely on it in areas that we wouldn't have otherwise."

Denise also spoke about the benefits of instructional technology for determining students' levels of proficiency and personalizing curriculum to meet their needs. She described how she can use technology to assess students and modify her instruction accordingly:

> You can assess the student's learning level, monitor their progress, and identify where they're facing challenges with specific skills or concepts. It allows you to intervene and give instruction on the topics they struggle with. In the case of Lexia, if a student is stuck at a certain point, I check these instances about once a week. I can address the sticking points through mini-lessons or adjusting the materials accordingly or Q-teach a concept

> to a small group of students. It helps me know which students are truly grasping the content and making progress and who may need more help.

The Spatial Dimension. Denise emphasized the importance of balancing screen time to avoid overexposure and how 1:1 device accessibility in the classroom, as opposed to a computer lab, offers the flexibility for students to tap into varied resources simultaneously. Additionally, Denise shared her belief in the developmental suitability of ramping up the use of instructional technology in third-grade, rather than in earlier grades.

> It's a good time to start using more technology. By the end of the year, they're just amazing. They can put together Google slide shows and presentations with sounds and pictures. I mean, they figure it out, and then they start teaching each other. And they teach me. And so, it's really collaborative which I like.

Throughout her narrative, Denise's growth as an educator and her evolving use of instructional technology is evident. Her journey has been shaped by the resources available in different places, the support derived from engaging with a community of educators, and the ability to modify curriculum according to student needs.

Keri

Drawing on her 18 years of teaching experience, Keri’s description of her journey offered insights into how the evolution of instructional technology has shaped her pedagogical practices. During her tenure, she has witnessed the integration of technology into education, marking a shift from more traditional methodologies to dynamic digital tools.

The Social-Historical Dimension. Instructional technology has played a pivotal role in Keri's collaboration with colleagues. Her use of technology enhances cooperation with her immediate peers and broadens her connections to a virtual network of educators, thereby

enriching her teaching methods. Keri reported collaboration, once restricted by geographical boundaries, has evolved dramatically with the assistance of instructional technology. The introduction of platforms, like Google Docs and online communities, eliminates physical barriers making lesson planning and resource sharing more efficient. For instance, Keri cited an example where communication with educators using the same content made transitioning between math programs smoother than might have been the case without it.

> I was able to gather an incredible amount of content in such a short time – I mean, people just handed over their files like it was nothing. I ended up with a full year's worth of curriculum materials related to math tasks, and I was genuinely astonished. The ease with which people shared their resources was truly remarkable. This experience allowed me to contribute as well, and when I encountered challenges or struggled with something, I could share it with the community. It was fantastic to see how people would engage with me, either by sharing answers to my questions or their own successful classroom activities. Contributions came from places like Texas, another came from someone on the east coast. The connections spanned the country, and it was truly gratifying to be part of a wider educational community than just Magnolia.

Utilizing technology to collaborate with other educators, Keri's experience reflects a historical shift towards collective learning among teachers, moving away from the isolated teaching methods of the past.

The Temporal Dimension. Keri's narrative spanned across time, highlighting the fluidity of teaching practices as technology advances. She detailed the evolution of her teaching techniques, influenced by the ever-changing landscape of instructional technology. The shift to distance learning during the 2020 and 2021 academic years accelerated her use of technology

and deepened her insight into its potential for enhancing engagement and personalization. "I think it just really forced me to try and think about delivering curriculum and gathering their learning in different ways. You know, we just had no other option."

During this period of distance learning, she integrated various digital tools and applications, many of which she continues to use in the classroom today. Her adaptability emphasizes the resilience educators need amidst change. This progression underscores the continuous transformation of teaching strategies, where technology plays a dual role: both driving and guiding shifts in the educational landscape.

Keri further explained, through the use of instructional technology, students are presented with opportunities to derive their own understanding, employing their preferred modalities, and constructing meaning.

> Sometimes students share resources with me, like videos or helpful content. I can then share them with the entire class through our Google Classroom. This is especially beneficial for students who require additional support in advance, such as those in our IST (Instructional Support Team) program. I can also create digital resources that they can print out at home. This is particularly helpful for students who struggle with organization, as they can easily access and print materials themselves, promoting a sense of ownership over their learning. The goal is to empower students to take an active role in their learning.

Another technique Keri highlighted involved students crafting their own videos, with a document camera, recording their problem-solving processes and explaining various strategies. These student-generated videos became part of their study tools, allowing them a personalized

reference point. This method, she expressed, enhances student comprehension, and fosters a feeling of accountability for their learning.

The Spatial Dimension. Describing her approach to blending physical and digital realms, Keri explained instructional technology, including Chromebooks and digital whiteboards, reshapes classroom spatial dynamics, and opens up avenues for diverse learning experiences. As an example, she mentioned the introduction of vertical whiteboards in her classroom and explained how this setup enabled students to record solutions directly on walls during math sessions, and then capture their solutions with photos and incorporate them into study guide slides. Keri emphasized the value of this method, noting that it provides students with the flexibility to document their individual strategies or collaborate in groups. She observed that transforming tangible work from whiteboards to digital formats enhances student engagement and encourages peer-to-peer learning, ultimately deepening their understanding of the subject.

Keri's integration of digital tools pushes the boundaries of traditional classroom walls. Alongside fostering student metacognition and ownership of learning, Keri spoke of the advantages with real-time technology interventions to tailor assignments to student needs and offer instant feedback. She pointed to her use of "Formative," a digital math platform devised for live, interactive assessments that lets educators design assignments, tests, and other tasks for online access. The platform's dynamism tailors feedback based on student inputs, guiding them towards a more profound understanding. "I provide homework digitally as well. I use Formative, and that's their homework every night, which I really like, because I can give them customized assignments based on their needs and feedback right away." Keri's use of these tools signifies instructional technology's role in transcending spatial constraints, creating a continuum between

physical and digital learning spaces, and allowing teachers to facilitate personalized learning experiences.

Jill

Jill's narrative is situated within the historical context of her 30-year teaching career. Her adoption of new teaching methods reflected the evolving landscape of education as well as her openness to change. Reflecting on her experience, Jill demonstrated how technology has gradually become an integral component of her instructional practices.

The Social-Historical Dimension. Emphasizing the transformative role of technology in the classroom, Jill described how increased accessibility to devices in the classroom has been a pivotal shift from previous years in which technology was used in isolation.

> Back in the day our excitement used to revolve around the computer lab visits. It was a big deal for the kids, each having around 30 minutes of instruction and some fun activities, like those paint-by-numbers kind of things. We even had a dedicated computer teacher. We eventually transitioned into having a few devices in our own classrooms. That shift allowed us to integrate technology into our teaching without relying solely on a designated technology teacher. We, as instructional teachers, took on that role. The real game-changer came when we finally got our own cart of Chromebooks. Each student had access to a computer, which transformed the learning experience. We were longer limited to just a station of eight computers, every student had their own device.

Jill highlighted how tools, like Google Docs and Google Classroom, enhance digital collaboration among educators by simplifying joint lesson planning and serving as hubs for sharing resources within online educator networks. This shift indicates a growing emphasis on

collective learning and community building among educators, distinct from the historical isolation of teaching experiences.

The Temporal Dimension. Jill's narrative traverses the temporal dimension. Revealing the evolution of her teaching practices in response to technological advancements, she recounted the value of instructional technology by describing the frequency with which she incorporates it throughout her day to engage with various stakeholders.

> Just going through emails in the beginning of the day, contacting parents, finding out things I need to know about programs, trainings, updates on the school and schedules. Then I use Google Classroom and look at my lesson plans for the day. I store all my resources there, and we have a shared Google doc that we use for all the teachers in third-grade, and I put links on there for resources that I'll use throughout the day, and the following year, I can use those, too.

The outbreak of the pandemic accelerated Jill's engagement with technology, prompting her to rapidly pivot to distance learning. This sudden transition reflected the temporal dynamics of teaching, where unforeseen circumstances necessitate rapid adaptation.

> We went from, I feel like 0 to 100 in that year, figuring out different technologies and tools that we were going to be using and the different programs, how to deliver our instructions over the internet. It was a huge growth year for all of us.

The Spatial Dimension. Describing the blending of physical and digital interactions in her teaching, Jill highlighted her typical day starts with digital interactions, merging both her personal and professional realms. She predominantly uses Google Classroom for collaborating with colleagues on shared lesson plans, exemplifying how digital tools intersect with the physical classroom environment.

Additionally, Jill utilizes applications including Scholastic Reading Inventory (SRI), Lexia, and Raz-Kids to collect student data and tailor content to individual needs. “They all work on their own individual levels on that; we get data that shows us what we need to reteach, or some review skills for them.” Furthermore, Jill emphasized the advantage of instructional technology in catering to students with special needs within the general education classroom, reducing the frequency with which they need to leave the classroom to receive special services.

> We have audiobooks for kids to access different textbooks at a higher level, that they can read from. We also have speech-to-text for kids that have some learning disabilities, for typing or writing issues. So, it's easier for them. You can really provide some individualized instruction for them, which is otherwise hard when you have 24 or 30 kids in a class.

Jill's story reflects the interplay of the historical, temporal, and spatial dimensions and how technology has transformed her teaching practices as well as the broader educational landscape.

Bethany

In retelling her narrative, Bethany, a teacher with 31 years of experience, offered her experiences and perceptions regarding the use of instructional technology in the fourth-grade classroom, highlighting various aspects of her technology integration. She also reflected on the differences in using instructional technology with fourth graders versus second graders, which she previously taught.

The Social-Historical Dimension. Bethany noted the backdrop of the COVID-19 pandemic served as a pivotal turning point. She reflected on the pandemic-induced remote learning experience of 2020, and its subsequent impact on teaching practices, were catalysts for journey into the world of instructional technology. Bethany described her classroom practices

involving instructional technology, sharing she uses a grid for weekly lesson plans, works collaboratively with colleagues to create newsletters using Google Docs, and utilizes Google Classroom for organizing lessons and resources. She also emphasized the importance of sharing resources across the district, enhancing collaboration and resource availability.

> For planning purposes, we do also have a lot of our materials and lessons and things stored in Google Classroom. We're storing them this year to in the drive. So, we're kind of trying to keep a good bank, so we're sharing that way, so all we really sort of expanded just keeping track of our lessons and having it all in one place for everybody.

The Temporal Dimension. As with each participant, Bethany's experiences with instructional technology were situated within the trajectory of time. The interview revealed a conversation spanning different stages of her teaching career, from her initial encounters with instructional technology to the present day. Additionally, Bethany revealed her usage goes beyond the classroom, encompassing activities such as lesson planning, resource creation, and collaboration with peers. Over time, the way Bethany has engaged with technology has seen significant shifts. Reflecting on her journey, she described a transition from traditional teaching approaches to embracing digital tools, a change further amplified by distance learning during the pandemic.

> Oh, I definitely got more competent at using more for lesson planning and finding resources. It makes me not ever want to do [distance learning] ever again. It was horrible, but I did learn how to utilize more digital tools and things.

Bethany's narrative displayed how distance learning accelerated her technology adoption, compelling her to become more proficient in digital lesson planning, resource discovery, and online collaboration. In addition to distance learning, the shift from teaching second-grade to

fourth-grade increased her use of instructional technology and how she learned from and with her students.

> With the transition to a different grade level, Google Classroom, Google Docs, and Slides became significant changes in my approach. I really embraced things and it's gone well. The kids are so helpful and many of the programs are much more intuitive and user-friendly, so we learn together. I mean, they really just get it, you know, and I'm getting it for the most part. So yeah, it's constantly changing. And they figure it out pretty quickly.

Throughout the interview, the passage of time was evident in Bethany's experiences. She spoke of gradual transitions in her teaching strategies, drawing comparisons between pre-pandemic and post-pandemic practices. Bethany's evolving engagement with instructional technology highlighted the dynamic nature of her teaching journey through different temporal phases.

The Spatial Dimension. Bethany's characterization of her use of technology revolved around her classroom as the central physical spatial context within her narrative. She described instructional technology as integrated into her daily routine, offering tools for lesson planning and resource management. Her description of Google Classroom and collaborative platforms illustrated how instructional technology integrates a virtual learning environment into her physical classroom.

Student engagement and motivation were noted as significant factors related to the use of technology and Bethany highlighted the need to retain hands-on and interactive components to keep students focused and invested. When discussing a new math program, Bethany mentioned how technology enhanced student interactions. She emphasized the balance achieved by allowing students to collaborate directly with each other and giving them the choice to use the

Chromebook or opt for other methods. “I mean, the kids are interacting with each other. They're not really on the computer. But there are these parts that you can use it or not use it.”

Expressing her concern, Bethany felt the district was placing too much emphasis on using technology for data collection from performance assessments. She pointed out the time dedicated to these assessments cut into valuable instructional time.

> It feels like our district is going for a lot of data gathering. And I think it's getting to a level that's really at the expense of instruction. I think [this year] we'll be having the three language arts, maps assessment and three math ones, and it says it takes 20 minutes a piece, but in reality, it takes like two hours and that is a lot of time lost to assessment rather than instruction.

Bethany's journey through the social-historical, temporal, and spatial dimensions provided a platform for understanding her experiences with instructional technology. The interplay between these dimensions revealed her experience with instructional technology, within the broader context of her career, over time, and between physical and virtual spaces.

Whitney

Whitney, a fifth-grade teacher with 9 years of professional experience, was significantly earlier in her career than the participants. Her narrative is also presented within the three-dimensional space approach proposed by Clandinin and Connelly (2000).

Social Historical Dimension. Whitney shared, while she does not view herself as technologically savvy, she understands, given her age relative to many colleagues, she is viewed as a ‘digital native’ among educators.

> I remember, in my student teaching, like 10 years ago now, something like that, one of the teachers that I worked with was like, 'Oh, I'm so excited to have like a young person in the room to help me with technology,' and I was like, 'You drew the wrong card.'

Despite her perception she is not as technologically acute as her peers, Whitney described her frequent use of instructional technology in her teaching practice. Her daily routine begins by checking email messages on her phone to ensure she has not missed vital messages from parents or administrators. Whitney also utilizes Google Calendar to stay updated on upcoming events like meetings and workshops, exemplifying how technology has become intertwined with organizing schedules and planning.

Highlighting the advantages of digital curriculum, Whitney noted its ease of modification compared to traditional formats. This adaptability permits both publishers and educators to update content promptly, minimizing the reliance on outdated concepts. Whitney believes this fosters greater inclusivity and accessibility, enabling students to see themselves in the content and thereby enhancing their engagement.

> With history, for example, I think, as we become more aware of different people's perspectives, it's important to go back and make some of those changes. And if things are written in an incorrect way, or an insensitive way or more context needs to be added, I think it's really great that you can just kind of do that in the moment. I think there's so much value and having something that's like current and easily adaptable.

Temporal Dimension. Speaking about the digital aspects of her teaching that unfold over the course of her day, Whitney elaborated on her use of 1:1 devices (Chromebooks) for writing and reflection, underscoring technology's role in providing timely and thoughtful feedback.

> [The students] start the day pretty much with the computer, with writing. I utilize my own device sometimes in class to just kind of like pop on their documents, and that will help inform me of any, teaching points that I want to use in the future, if I want to pull a small group, or you know, what advice I want to give a kid a certain day. So I really think that it's beneficial to have that instant access to their work and not have to have me like walk around and like read over a kid's shoulder, and that gives me the opportunity to sit and think before I say some random thing to a kid It makes my advice and my compliments, and my next steps a little bit more reflective, because I've had a chance to think about it, whereas I feel like, if you're like just standing over a kid reading their work, you feel like you have to say something immediately.

Whitney often starts her lessons by displaying digital resources on a large monitor. This allows students to see introductory content and exemplary works from either her or past students. She finds her device crucial for her daily organization and planning. Referring to her extensive use of digital resources, she says, "I'm a 'thousand tabs open' kind of person, so I have all these digital resources ready to go." Throughout her interview, Whitney regularly commented on how she takes a cautionary approach to utilizing technology and remains aware that it can be isolating unless it is thoughtfully implemented.

> When [the students] are on devices, they are usually quiet because they are engaged in the work, but sometimes they are just quiet because they are sedated by this screen that's in front of them.

Spatial Dimension. To combat the potential for too much screen time, Whitney intentionally utilizes instructional technology for just a portion of most lessons and provided an example related to her use of an online science program called Mystery Science.

> They love it because there are online games and a mystery to solve, but it allows for time to do really cool things like chemistry unit, where they got to blow up bags and stuff. So, it's kind of like a nice balance between ‘watch this in an engaging way and then go experience it in the real world.’ I like to strike a balance. Technology is great, but so is hands-on experience. I want my students to see, touch, and interact with their learning.

The spatial dimension of Whitney's narrative encompassed an array of physical and digital environments. She highlighted the balance between digital and physical engagement through activities that involve materials and charts posted around the classroom, coupled with a fair amount of writing in notebooks in addition to in Google Docs. Describing the use of technology beyond the confines of the classroom, Whitney highlighted collaborative tools, like Google Drive and Zoom, for grade-level collaboration. She emphasized how these tools expand the spatial reach, enhancing communication and cooperation among educators situated in various locations.

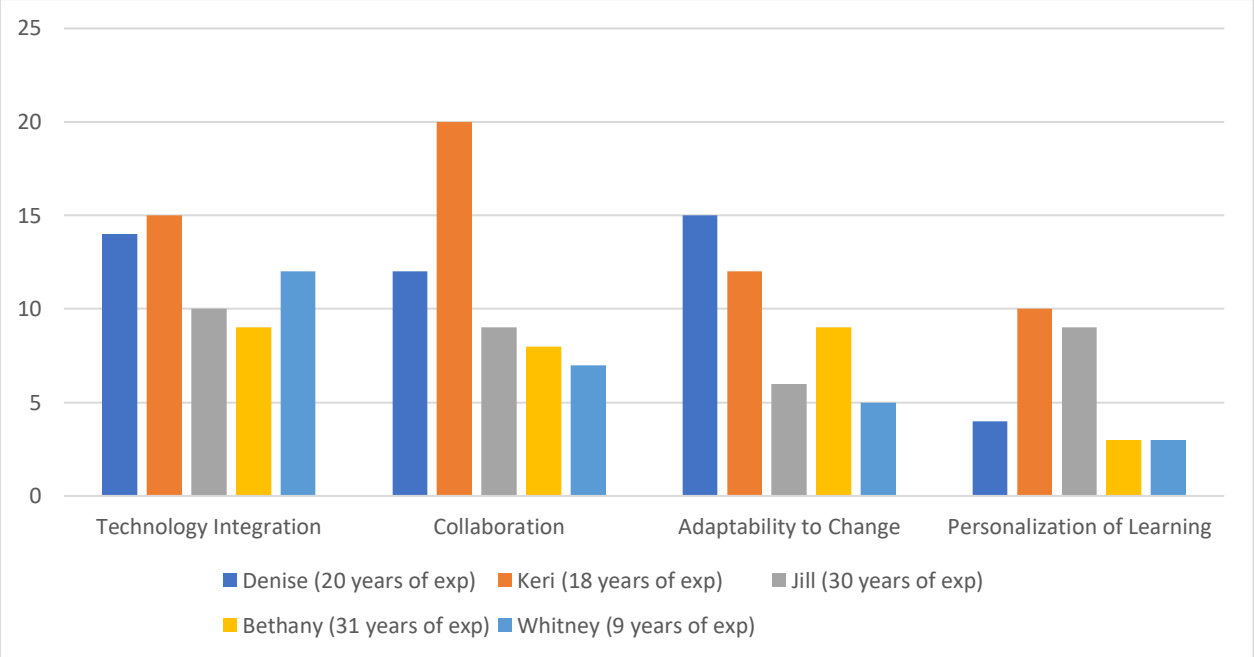
The integration of technology resonates throughout Whitney's narrative, elucidating the symbiotic relationship between technology and education, anchored within the social-historical, temporal, and spatial dimensions. She remains acutely aware of technology’s potential limitations, by acknowledging the capacity of instructional technology to distract students. However, she embraces a balanced approach that interweaves digital and tangible experiences, demonstrating her recognition of the spatial and temporal significance for maintaining real-world connections in education. Whitney’s narrative account provides an understanding of the manner in which technology shapes her teaching practices, and the dynamic interplay between the virtual and physical realms of learning.

Themes

According to Bloomberg and Volpe (2018), "Qualitative analysis usually results in the identification of recurring patterns, which are essentially themes that cut through the data." Once the narratives were restoried and member-checked, they were manually coded. Multiple themes emerged from the process of coding the restoried narratives: the evolution of technology integration, collaboration as professional learning, adaptability to change, and personalization of learning. Each theme was examined through the underlying conceptual framework of Kotter's (2012) principles for change, and the complementary theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005).

Figure 2

Frequency of References to Themes in Raw Data



Evolution of Technology Integration

All participants' narratives for this study shared their instructional technology practices evolved over time. Their stories revealed the incorporation of technology in education progressed from sporadic and supplemental use to becoming an indispensable aspect of teaching methodologies. This transformation was influenced by factors, such as improved device accessibility, advancements in digital tools, and the necessity of remote learning during the pandemic.

Denise, a seasoned educator with 2 decades of experience, acknowledged both the challenges and the rewards of integrating technology, recognizing its capacity to amplify her teaching. Denise emphasized her professional learning and collaboration with colleagues as instrumental in expanding her technological proficiency, guided by the principles of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005). Her story demonstrated that being part of a learning community helped her shift from having limited access to computer labs to a one-device-per-student setting. This change allowed her to provide instruction based on data, tailored to each student's learning requirements. Collaboration as a form of professional growth was echoed by each of the other participants.

Keri, another experienced teacher of 18 years, depicted a journey that mirrored the broader evolution of educational technology. She recognized the role of technology in fostering collaboration, transcending geographical constraints, and uniting educators across digital platforms. Keri emphasized that blending physical and virtual spaces can promote collaboration and focus on student-centered learning. Her experiences illustrate how technology reshaped her teaching methods, allowing students to actively shape their own understanding connect with wider external learning communities.

With 30 years of teaching experience, Jill offered a deep understanding of her evolution with instructional technology. The changing educational landscape and her eagerness to adopt innovative teaching methods were evident in her narrative. Her story highlighted the progression of technology from a sporadic novelty to a fundamental classroom tool, primarily because of increased device accessibility. Jill's use of digital tools for collaboration and assessment underscores the balance between virtual and physical spaces, demonstrating technology's influence on pedagogical strategies.

A seasoned teacher with 31 years of experience, Bethany framed her narrative against the backdrop of her extensive career. The COVID-19 pandemic emerged as a pivotal force in her story, propelling her deeper engagement with instructional technology. As she charted her journey, the integration of tech tools into varied facets of her teaching, from lesson planning to resource distribution, was evident. While recognizing technology's power to tailor to each student's needs, she also voiced reservations about an overemphasis on data-driven assessments diminishing quality teaching time. Her tale paints a picture of the fluctuating role of instructional technology across decades.

On the other hand, Whitney, who has been in the teaching profession for only 9 years, brought a fresh perspective to the technology narrative. While others may see her as a digital native, she struck a note of caution about the potential dangers of too much screen time. Striking a balance in technology use was integral throughout her narrative, highlighting the value of purposeful technology integration. Whitney's narrative illustrated a harmonious blend of the digital with the tangible in the classroom.

Together, these educators' stories portray the intricate nature of weaving instructional technology into education. Their experiences highlight the interrelation between historical

perspectives, time-related changes, and varying environments. The narratives resonate with principles of connectivism (Siemens, 2005) and social constructivism (Vygotsky, 1978), evident in their technology-integrated teaching methods and anchored in Kotter's change principles (2012). Participants' shared experiences illuminate the significant influence of technology on pedagogical methods, suggesting a continually advancing educational horizon.

Examining these narratives together, it is evident the path of integrating technology into teaching spans a broad spectrum, from the experiences of seasoned educators like Denise, Keri, and Bethany, to the fresher perspectives of Whitney. These tales consistently highlight the evolution and adaptation of teaching methods, signifying a dedication to blending traditional and innovative approaches. Each account delves deep into personal journeys while touching upon shared challenges, spotlighting technology's critical role in shaping contemporary pedagogy. These narratives elucidate that while educational tools and techniques may evolve, the core essence of teaching — emphasizing student development, fostering collaboration, and promoting 21st-century learning skills — consistently endures.

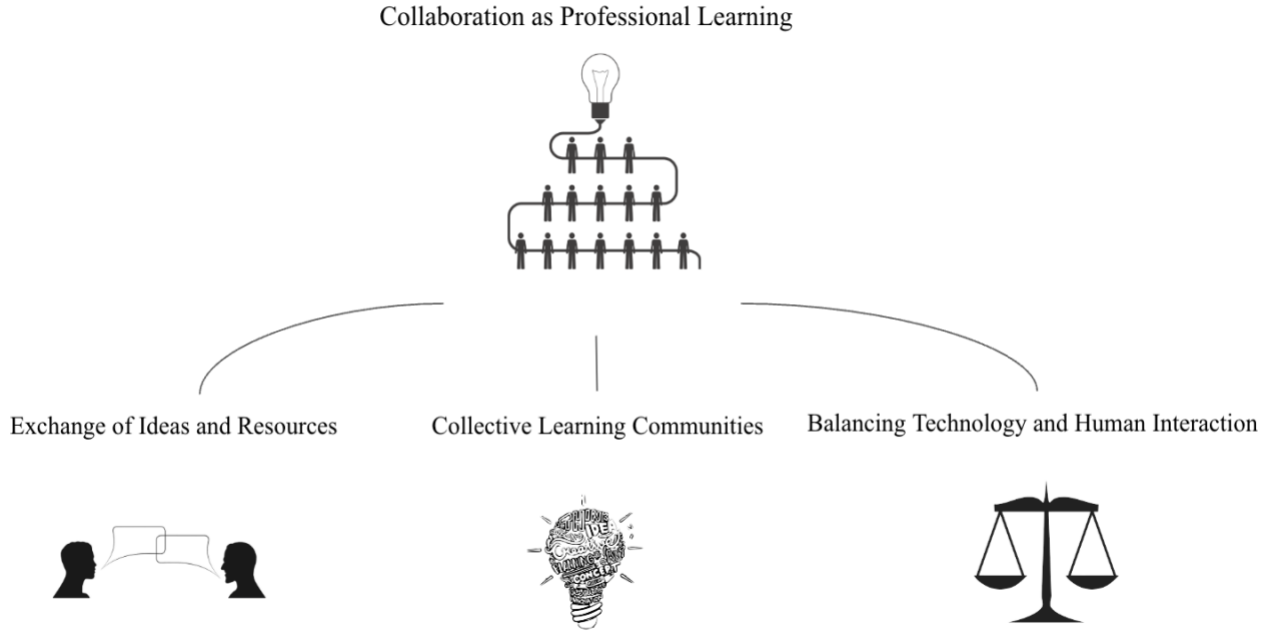
Collaboration as Professional Learning

The most commonly mentioned thread among participants' narratives was the pivotal role of instructional technology in collaboration as a means of professional learning. The narratives of the participants emphasized collaboration as a key theme, particularly in relation to instructional technology. They highlighted their cooperation with peers and colleagues to successfully incorporate these tools and use digital platforms to work together, further enriching their teaching methods. Each participant recognized using technology to learn with and from others improves their teaching practice by allowing them to gain insights from a broad range of colleagues and become more proficient in various tools.

Connectivism, as proposed by Siemens (2005), posits that learning is not confined to an individual's cognitive processes and it is influenced by connections and networks. Social-Constructivism, as proposed by Vygotsky (1978), emphasizes the role of social interaction in learning, with peers and mentors contributing to the development of higher-order thinking and problem-solving skills. Both theories underscore the importance of collaboration and the collective nature of knowledge construction. Several subthemes emerged from the participants, with collaboration as a means of professional development. These subthemes included the exchange of ideas and resources, collective learning communities, and balancing technology and human interaction.

Figure 3

Collaboration as Professional Learning



Exchange of Ideas and Resources. Denise, Keri, Jill, and Bethany emphasized the value of exchanging ideas and resources among colleagues. Their narratives illustrated collaborative

platforms, such as Google Docs and Google Classroom, fostered a collaborative culture where educators could co-create lesson plans, share resources, and collectively address challenges. Educators collaboratively constructing knowledge by sharing experiences and resources is consistent with connectivism (Siemens, 2005). For example, Keri's experience of collaborating with educators from across the country through digital platforms demonstrated the power of shared experiences in fostering collective learning. Her transition to a new math program was made smoother through the shared insights of educators, highlighting the efficacy of collaborative networks in enhancing teaching methods. Furthermore, Keri recounted how these shared insights led to students constructing meaning by creating their own digital resources.

Collective Learning Communities. The narratives illustrate that instructional technology enables educators to transcend geographical boundaries while fostering the creation of communities that facilitate collective learning and sharing of best practices. Denise and Keri recounted attending professional development workshops and conferences centered on instructional technology. At these gatherings, they harnessed the expertise of their peers regarding the effective use of data generated from specific digital tools for assessing student learning. Whitney highlighted how virtual meeting platforms bridge the gap between different campuses, fostering regular collaboration where teams can articulate across grade levels and campuses, sharing ideas and aligning content. Denise's journey of planning alongside her grade-level team emphasized the collaborative essence of technology integration. By engaging in joint online lesson planning and creating shared documents, she illustrated how the application of instructional technology permeates beyond classroom walls, refining instructional strategies and curriculum development. Such collaborative endeavors resonate with the tenets of Social-Constructivism, in which shared learning experiences catalyze the acquisition of novel skills and

knowledge and reinforce best practices such as data-informed instruction and curriculum alignment by providing the opportunity for educators to learn with and from one another.

Balancing Technology and Human Interaction. While technology-enhanced collaboration is essential, all participants expressed the desire to maintain a balance between technology and human interaction. Bethany and Whitney specifically noted the potential for technology to isolate students and expressed the importance of integrating hands-on experiences and face-to-face interactions. Maintaining social interactions among students within an educational setting aligns with Vygotsky's Social-Constructivist theory, highlighting the importance of social engagement in cognitive growth (1978). Bethany expressed a specific concern over the time spent on computers for the purpose of assessing students and shared her worry that the district's focus on collecting data may be detrimental to the time spent teaching.

Participants' narratives highlight the reciprocal relationship of collaboration and integrating instructional technology, both as a method for, and a subject of, refining teaching methods and improving student learning experiences. The principles of connectivism and Social-Constructivism are evident throughout the experiences of participants, demonstrating teaching and learning with instructional technology are interconnected processes influenced by connections, shared experiences, and collaborative efforts. Through cooperative lesson planning, collaborative learning communities, and resource sharing, participants shared how they harness instructional technology to collaborate, develop professionally, and create meaningful learning experiences for their students.

Adaptation to Change

A third theme of the narratives was one of adapting to change. Participants shared stories of changes brought about by technological advancements and unforeseen events, such as the

COVID-19 pandemic. They highlighted the need for flexibility, the ability to learn new tools, and the willingness to experiment with different approaches in response to evolving circumstances. For example, with the shift to distance learning, participants adopted using Google Classroom to post assignments for students and Google Docs for shared lesson planning with grade-level colleagues. To that end, the participants' narratives mirror Kotter's (2012) principles of change, emphasizing the need for flexibility, the willingness to learn and experiment with new tools, and the importance of collaboration and shared engagement in response to evolving circumstances. These principles were evident throughout the narratives.

Sense of Urgency and Building a Guiding Coalition. Participants articulated the significance of instructional technology and their need to adapt in response to the evolving educational landscape, whether due to technological advancements or unforeseen events like the COVID-19 pandemic. They collaborate with colleagues and engage in professional development, forming a guiding coalition to facilitate their technological integration.

Strategic Vision and Short-Term Wins. The narratives reflected participants' vision for incorporating technology to enhance student learning. They set goals, experimented with new tools, and celebrated small successes as they integrated technology in their classrooms. The pandemic accelerated their adoption of technology, leading to rapid experimentation and short-term victories, some of which led to long-term changes. An example of this includes using conferencing platforms, such as Zoom, to communicate with other educators and conduct parent-teacher conferences remotely, even following the return to in-person instruction.

Enabling Action and Removing Obstacles. Actively learning new tools, the teachers emphasized collaborating with colleagues and seeking ways to integrate technology into their

teaching methods. With support from their communities, they navigated challenges and consistently enhanced their technological abilities.

Sustaining Acceleration and Anchoring Change. Participants shared their consistent instructional technology use in their teaching methods, building on their early successes. For instance, even though the shared lesson planning on Google Docs began as a solution to distance learning challenges, it remains crucial for grade-level planning even after resuming in-person classes. Such experiences influence their teaching strategies, solidifying these new methods in their daily practice.

Kotter's (2012) principles of change were evident throughout the participants' narratives. Their stories reflected the urgency of embracing instructional technology in response to educational shifts in response to both technological advancements and unexpected events, such as the COVID-19 pandemic. Collaboration and engagement in professional development exemplify the generation of coalitions essential for effective change to occur. For a guiding coalition to be effective, its members need to have the skills and knowledge to understand the change required and to lead their peers. Through continuous learning, these members can ensure that the change is relevant and by investing in their own growth, they set an example for the rest of the organization.

Participants' descriptions of short-term wins such as increased student engagement, mirror the principle building of momentum through early achievements. The active engagement in learning new tools and overcoming obstacles illustrates the significance of enabling action and removing barriers. As they sustain their technological integration efforts and anchor these changes in their teaching practices, the participants demonstrate the principles of sustaining acceleration and ensuring lasting transformation. These narratives align with Kotter's change

principles (2012), and illustrate the pivotal role of adaptability in navigating the evolving landscape of instructional technology.

Personalized Learning

In examining the narratives, personalized learning emerged as a theme, highlighting how participants utilized technology to tailor curriculum and learning experiences to students' needs. As with the previous themes, the researcher analyzed the theme of personalized learning through the underlying conceptual framework of Kotter's (2012) principles for change and the complementary theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005).

Denise's account emphasized her leveraging instructional technology to assess students' learning stages and monitor their advancement. Using tools like Lexia, she pinpoints the areas where students struggle. Based on these insights, she adjusts her teaching approach to cater to students' specific needs, aligning with their zone of proximal development, as described by Vygotsky (1978).

Echoing this approach, Jill shared the effectiveness of using instructional technology for personalized learning experiences with larger groups of students. Reflecting on the shift from scarce computer lab access to an era of 1:1 device ratios, Jill expressed how the introduction of Chromebooks within the classroom created opportunities for interconnected learning, where students could interact with diverse materials, at their learning level.

Keri's narrative exemplified Kotter's principles of change (2012) with empowerment among stakeholders. She shared her use of instructional technology as a medium for collaborative learning, with students constructing their own knowledge and learning with and from one another (Vygotsky, 1978). Her collaborative learning with professional virtual

communities allows educators to construct knowledge and openly exchanged resources, echoing Siemens principles of connectivism (2005).

Consistent with Kotter's principles of change (2012), Jill's narrative showcases a momentum for change. Her integration of instructional technology is also grounded in social constructivism (Vygotsky, 1978), as she utilizes digital tools to provide tailored feedback, guide students' learning experiences, and provide responsive instruction that supports individual understanding. Jill's focus on technology's role in accommodating diverse needs aligns with connectivism (Siemens, 2005). Describing her use of audiobooks, speech-to-text tools, and individualized resources, Jill’s reflection of instructional technology enhancing accessibility demonstrates the connectivism principle of learning as a networked process, distributed among people and tools.

Social constructivism (Vygotsky, 1978) is reflected in Bethany's integration of instructional technology in which technology acts as a platform for personalized learning experiences. By adapting digital curriculum and customizing assignments, she utilizes instructional technology to meet the needs of students within their respective zone of proximal development. Bethany's emphasis on collaboration and resource sharing aligns with connectivism (Siemens, 2005).

Finally, Whitney's narrative incorporates Kotter's principles of change (2012), emphasizing anchoring new approaches in the culture. Exhibiting social constructivism (Vygotsky, 1978), she uses technology to facilitate reflective and personalized feedback. Whitney's awareness of technology's potentially isolating effects and commitment to a balance between physical and digital interactions, also resonates with the connectivism principle of learning as a process thriving in diverse and interconnected learning spaces (Siemens, 2005).

Summary

Utilizing the narrative inquiry method, this study examined the experiences of third-grade through fifth-grade teachers with instructional technology. Participants recounted their experiences with instructional technology, highlighting various aspects of their journey. Each participant articulated ways in which they incorporate instructional technology into their teaching practices. Following the restorying, member checking, and coding processes, Clandinin and Connelly's (2020) three-dimensional space approach was used to analyze participants' lived experiences in the social-historical, temporal, and spatial dimensions. Four themes emerged from the narratives: the evolution of technology integration, collaboration as professional learning, adaptability to change, and personalization of learning. Each theme was examined through the underlying conceptual framework of Kotter's (2012) principles for change, and the complementary theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005). Subthemes including the exchange of ideas and resources, collective learning communities and balancing technology with human interaction emerged under the theme of collaboration of professional learning.

The themes that emerged from examining participants' narratives may serve as useful information for decision makers when considering the implementation of instructional technology. The narratives reflect that instructional technology, initially born from urgency followed by structured change, can be utilized for increased personalized learning, heightened accessibility, collaboration, empowerment, and interconnectedness. The participants' experiences demonstrate the power of combining pedagogical insights with technological advancements, ultimately enhancing the educational journey of educators and students, alike.

The exploration of participants' experiences with instructional technology sheds light on the landscape of teachers' efforts to integrate technology into their teaching practices. Employing the analytical framework proposed by Bloomberg and Volpe (2018) and drawing on Clandinin and Connelly's (2020) three-dimensional approach, the study offers insights into dimensions shaping educators' experiences. The shared themes of the evolution of technology integration, collaboration as professional learning, adaptability to change, and personalization of learning contribute to a deeper understanding of the intricacies surrounding instructional technology integration.

CHAPTER 5: CONCLUSION

The purpose of this qualitative narrative inquiry was to understand third-grade through fifth-grade teachers' experiences implementing instructional technology in their classrooms before, during, and after the 2020-2021 academic year. This year marked an extended period of distance learning necessitated by the COVID-19 pandemic, during which teachers heavily depended on instructional technology. Teachers' experiences were comprehensively explored through qualitative narrative inquiry to inform future decisions and research concerning instructional technology integration in third-grade through fifth-grade classrooms.

The research questions in this study provided the framework for 1:1 semi-structured interviews, with questions crafted to allow participants to express their experiences with instructional technology in their teaching practices.

> **Research Question 1:** How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology?
>
> **Research Question 2:** How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?

The coding and analysis revealed four themes, many of which were consistent with existing literature, to varying degrees. Five participants openly discussed their personal experiences with instructional technology. These recorded transcripts were subsequently transformed into a narrative format, member-checked, and analyzed using the three-dimensional space approach introduced by Clandinin and Connelly (2000). This approach aided the researcher in understanding participants' experiences through: the social-historical dimension, also known as

place; the temporal dimension, also known as time; and the spatial dimension, also known as space (Clandinin & Connelly, 2000). An analysis of these narratives uncovered four key themes: the evolution of technology integration, collaboration as professional learning, adaptability to change, and personalization of learning. Themes were examined through the conceptual framework of Kotter's (2012) principles for change and the complementary theoretical frameworks of social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005).

Interpretation and Importance of Findings

The findings from this narrative inquiry elucidate the role of instructional technology in pedagogical practices and the utility of instructional technology for teachers in addressing the diverse needs of students, with a particular emphasis on narrowing achievement discrepancies through tailored instruction (Arnett et al., 2018; Jung et al., 2019). Motivation was identified by Jung et al. (2019) as a central determinant that drives the inclusion of instructional technology within elementary education environments. The insight of Jung et al. (2019) aligns with Arnett et al.'s observations, where the latter noted various factors influencing teachers' willingness to embrace educational initiatives, ranging from a desire to offer engaging content to improve student achievement to streamlining time management (Arnett et al., 2018).

Study participants explained their tailored use of instructional technology to meet curriculum requirements based upon individual student needs. They often utilized data about student performance, generated from digital platforms, to modify and deliver targeted instruction using specific content, interventions, and tools, like text-to-speech, to enhance accessibility. These insights highlight the significance of instructional technology in customizing learning experiences. For students to achieve desired learning outcomes and cultivate skills consistent with 21st-century learning, educational leaders must create an environment that recognizes

diverse motivations among educators to promote the advantages of instructional technology, for both students and educators.

The unprecedented challenges introduced by distance learning during the COVID-19 pandemic necessitated the rapid implementation of instructional technology by educators. Similarly, Sokal et al. (2020) highlight an increase in the professional demands of teachers, propelling technology more centrally within instructional settings. With the return to in person instruction, teachers continue to navigate a landscape punctuated by multifaceted roles, including mastering emergent instructional technologies, and employing data-driven teaching methods. This increase in use of instructional technology underscores the importance of incorporating dedicated periods of professional learning and collaboration among teaching professionals. Echoing the sentiments of Sokal et al., the onus of educational administrators is to recognize and respond to the amplified use of and need for instructional technology by procuring resources and providing time for teachers to learn how to use them effectively from and with one another.

Research Question 1

Research Question 1, “How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology?” was developed to explore and understand teachers' experiences using instructional technology in their teaching practice. Each teacher interviewed described their engagement with and utilization of instructional technology to communicate with stakeholders, collaborate with other educators to design and deliver content.

Communicating with Stakeholders

Each participant referenced using Google Classroom as a tool to connect with other teachers, students, and parents. Keri noted how she uses it as a Learning Management System

(LMS) where assignments and homework can be accessed beyond the course of the school day, and progress can be consistently monitored. Whitney shared how she posts writing assignments, using Google Docs, to observe students' work in real time from her laptop. Bethany described how she and her grade-level colleagues collaborate on and disseminate a weekly newsletter with parents to communicate curriculum and invite volunteers to sign up to participate in events like field trips, art projects and class celebrations. Keri also noted her use of digital tools, such as screencasts, (short videos of screen recordings), to communicate instructions for substitutes and applications, like Class Dojo, (a digital sharing platform) that allows teachers to document the day in class to share with families. These real-time updates and swift communication mechanisms facilitate transparency and timely stakeholder interactions. Consistent with the research, participants demonstrated their utilization of instructional technology to encourage a more interconnected educational community by simplifying access to information, and aligning educational goals with results (Reiser, 2018).

Collaborating with Other Educators

In addition to communication with stakeholders, participants' narratives reflected on the capacity for technology to facilitate their collaboration with colleagues who were proximal and with educators who were part of a broader community of professional learning. Each of the five participants shared how they create and share lesson plans with their grade-level teams using Google Docs and Google Classrooms, (online tools that streamline collaboration and assignment management), for educators and students. Whitney also reflected on her use of Zoom to ensure curriculum alignment across different district sites. Keri benefited from a virtual educator community, accessing resources for a new math program, while Jill gained insights from remote summer professional development through interactions with fellow educators.

The narratives of the participants in this study mirrored those in the 2019 study by Dillon et. al, in which participants noted a boost in confidence and a favorable impact on their teaching methods, leading to a more adept incorporation of technology within their instruction. Participants in this study also noted becoming more adept at using instructional technology during and following the 2020-2021 academic year. In contrast to Dillon et al.'s study however, participants interviewed seemed to place greater value on the use of technology to collaborate with other educators than on professional development specifically targeted at improving their use of instructional technology. Participants consistently shared their collaboration with other educators through the use of technology improved their ability to effectively integrate instructional technology into their practices. This difference may be the result of the increased availability of and accessibility to online video conferencing platforms following the pandemic. Using technology, such as Zoom, teachers could more readily seek help from colleagues who were not proximal.

Schleifer et al. (2017) found by working together, teachers can see and interact with various tools, methods, and teaching approaches showcased by their peers, which is consistent with the findings in this study. Exposure to the practices of others makes it more probable for teachers to adjust their own teaching methods. Furthermore, collaboration enables teachers to adapt and tailor lessons based on students' performance in other grades or subjects. Schleifer and colleagues (2017) synthesized the research on teacher collaboration and its impact on student learning and concluded that quality collaboration leads to better teaching, and that teachers who collaborate are more likely to adopt new instructional practices, including those involving technology, resulting in improved student engagement. Consistent with Schleifer et al. (2017),

the study participants identified collaboration as a form of professional development, and a means for improved student outcomes.

Consistent with social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005), results of this study emphasize collaboration as a vital aspect of learning, i.e., knowledge creation, for both students and adults. As highlighted by the study, technology plays a pivotal role in enabling connections among educators with digital tools, participation in online communities, and utilizing the broader internet to explore, connect with knowledge sources, and engage in continuous learning. Such technological resources are fundamental for teachers to stay updated, and adaptive to evolving knowledge landscapes with access to a multitude of diverse perspectives.

Designing and Delivering Content

Participants reflected on their use of technology to create and deliver lessons, and to store and access curriculum and resources from prior years. Whitney noted she uses her laptop as a digital lesson plan-book, with tabs for each resource, open and ready for the day. She begins many lessons by displaying digital materials on a monitor, allowing students to see introductory content and examples of student work designed to scaffold learning. Bethany and Denise also noted how they frequently introduce content with a video to pique student interest and facilitate student engagement.

Participants consistently related their use of instructional technology as a method to increase student accessibility, obtain data to inform instruction, and tailor learning experiences. Jill shared that technology platforms designed to support literacy development in young learners, such as, SRI, Lexia, and Raz-Kids, allow student data to be collected which helps to tailor instruction. She stressed students learn at their own pace, and the data acknowledges gaps that

require review and potential re-teaching. Further, Jill praised instructional technology for directly supporting students with special needs within mainstream classrooms. She mentioned the availability of audiobooks for supporting reading, and speech-to-text tools for those with writing challenges, reemphasizing a personalized approach enabled by technology in larger class settings.

Keri highlighted the advantages of using technology to individually tailor student assignments based on students' needs, as well as providing students with immediate feedback. She explained that she assigns homework using an adaptive tool, called Formative, a real-time assessment tool which adjusts to student answers, offering personalized feedback and helping students grasp the material more deeply.

The narratives demonstrate how participants utilize instructional technology to design, deliver, and enhance the learning experience by harnessing technology and digital tools to create dynamic, engaging experiences with increased accessibility and adaptive content, personalized to students' needs. Consistent with the literature, the practices described by participants collectively depict the evolving landscape of modern classrooms where technology is central to personalizing and enhancing student learning experiences. Educational models combining instructional technology with content-specific software provides educators and students with the benefit of immediate performance feedback. Such insights identify topics that might need revisiting or enhancement during in-person lessons (Wilkes et al., 2020).

Research Question 2

Research Question 2, "How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?" was developed to gather descriptions of how teachers use instructional

technology to evaluate and potentially enhance student learning. Participants' narratives included descriptions of how instructional technology was used to increase engagement and accessibility, personalize learning experiences, and allow students to construct their own meaning.

Engagement and Personalized Learning

Participants in the study consistently reported increased student engagement when instructional technology was applied thoughtfully to provide students with personalized interactive learning experiences for students with different needs. Describing her use of Lexia, a computer-based reading program, Jill noted her ability to provide her third-grade students with individualized reading instruction using the program to assess students' reading levels and providing them with lessons and activities appropriate for their individual levels, thereby tailoring content to the students' zones of proximal development (Vygotsky, 1978). Similarly, Keri reported Google Classroom provided her students with differentiated learning experiences in math. The system allowed her to create different learning paths for her students based on their individual needs, suggesting that instructional technology can be a valuable tool for personalizing students' learning for different needs.

Vygotsky's zone of proximal development (1978), which describes the range between what a learner can do independently and what they can achieve with guidance. Aligned with connectivism (Siemens, 2005), this guidance may be in the form of adaptive feedback from a software application or peers with whom a student might collaborate through the use of instructional technology. Participants' experiences are consistent with previous research demonstrating instructional technology can enhance students' achievement and students' metacognitive abilities, as well as increase engagement, motivation, and vital non-academic skills essential for 21st-century education (Alamri et al., 2020; Arroyo et al., 2014; Shemshack &

Spector, 2021; Tucker, 2021; Zheng et al., 2022). Instructional technology is a valuable tool for personalizing instruction and providing students with learning experiences that are tailored to their individual needs and learning styles.

21st Century Learning

The literature related to the role of instructional technology in preparing students for the complex and ever-changing world of the 21st century is consistent with the findings from this study. Integrating technology into learning experiences facilitates the development of the digital skills required to succeed in school and future careers (Framework for 21st Century Learning, 2019). For example, Bethany described using a variety of technology tools to teach her students about digital citizenship. This helped them to learn how to use technology safely and responsibly. Denise shared that she used technology to help her students develop their collaboration skills with platforms, like Google Docs and Google Slides, which allow students to work together on projects and assignments, even when they are not in the same physical location. Consistent with the literature, the findings suggest effective integration of technology with learning experiences can enhance digital literacy and promote the development of collaboration, communication, creativity, and critical thinking; essential skills for success in the 21st century (Framework for 21st Century Learning, 2019).

This study demonstrates the potential for instructional technology to address the multifaceted needs of teachers and students. Instructional technology has the capability to bridge achievement gaps, cater to diverse learning requirements, foster engagement, personalization, and 21st-century learning skills. From facilitating stakeholder communication, to enhancing collaboration among educators, and personalizing learning content, instructional technology is integral to the modern educational experience.

Echoing existing literature, the role of technology in promoting foundational theories like social constructivism (Vygotsky, 1978) and connectivism (Siemens, 2005) is evident. The ability of digital tools to foster collaborative learning, enable connections, and continually adapt to the ever-evolving knowledge landscapes ensures that educators are well-equipped to meet the challenges of teaching. In light of the recent increased emphasis on technology, especially due to the demands posed by the COVID-19 pandemic, it is imperative that educational leaders prioritize a conducive environment for its integration. Such an environment should facilitate professional development, encourage collaboration, and provide resources that recognize and respond to the multifaceted roles teachers now assume.

Implications

The findings of this study's examination of third-grade through fifth-grade teachers experiences with implementing instructional technology in their classrooms identified four themes, the evolution of technology integration, collaboration as professional learning, adaptability to change, and personalization of learning. A close examination of these themes illustrated alignment with the broader literature in the field, with nuanced divergence in areas of potential significance to teachers, educational leaders, and decision-makers.

Educators and Students

Instructional technology offers opportunities for educators to differentiate instruction, increase student engagement, and provide immediate feedback, allowing teachers to be more responsive to students' needs in real-time, ensuring a better chance at success for every student. For students, this means learning can be more relevant, engaging, and tailored to their individual needs, increasing the likelihood of growth (Vygotsky, 1978), which is consistent with the literature's emphasis of technology being a tool for enhancing student learning outcomes. The

journeys of participants in this study were rooted in necessity, and highlighted the significance of the evolutionary processes within the realm of technological integration (Arnett, 2021). Key moments in the participants' narratives included the transition from isolated use of technology by students in computer labs to 1:1 devices in the classrooms, and the shift from in-person to distance learning during the COVID-19 pandemic in 2020.

The theme and subthemes related to collaboration stress the importance of dedicated time for teacher collaboration and support (Arnett, 2021). This study delved deeper into the role of collaborative practices influencing the effectiveness of instructional technology. Participants consistently reported using technology to collaborate with colleagues to expand their professional learning communities. Through these communities of collaboration, they can learn from others and expand their own practices and confidence with instructional technology for student learning. Much of the existing research focuses on the need to provide professional development on the use of instructional technology with increased focus on technology and pedagogy in teacher preparation programs (Dillon, 2019) and through formal professional development training on specific programs (Agostini, 2013). The findings imply teachers can effectively learn from and with one another through instructional technology opportunities for professional collaboration.

Communities

The ability of instructional technology to bridge communication gaps implies that school communities can be more interconnected. Instructional technology can potentially reshape the landscape of family and community engagement in schools. By leveraging communication platforms and applications, schools can offer real-time communication, allowing parents to stay updated about their child's academic progress. The rise of virtual conferencing tools, such as

Zoom, has enabled parents to engage in meetings or conferences, even when they cannot be physically present. These platforms, combined with digital newsletters and shared calendars, create an environment of transparency and connection. Parents can be more involved in their child's education, receive timely updates and resources, and can contribute more effectively to the learning process.

Schools can utilize websites to host resources, forums, and workshops to engage families. Digital libraries further expand the reach of learning resources to families, while translation features in many tools ensure inclusivity for non-English speaking families. Social media platforms, such as Facebook and X, provide another channel for schools to share updates and achievements, connecting with families in spaces they frequent. While the opportunities presented by technology are vast, schools must recognize the potential barriers. However, unequal access to technology and varying digital literacy levels necessitate a hybrid approach to blend traditional and tech-driven engagement methods (Supovitz & Manghani, 2022). Thoughtful use of instructional technology can build robust bridges between schools and their communities, fostering a collaborative and inclusive educational environment.

Organizations and Institutions

The literature highlights the need to synchronize administrative leaders with educators for effective integration of instructional technology (Arnett, 2021), which is further underscored by the study’s findings of technological adaptability, stating while alignment is vital, educators' capacity to adapt to technological changes is equally essential (Kotter, 2012). Educational administrators, such as principals and superintendents, can model adaptability by utilizing technology themselves and allocating and procuring resources to support the use of instructional technology tools, such as updated devices and subscriptions to software applications (Agostini,

2013). The findings from this study highlight the importance of adaptability and allocating time and resources for educators to collaborate with colleagues to model and learn about best practices for implementing various forms of instructional technology.

The participant's narratives reflect the vital role school districts and leaders play in expanding pedagogical approaches that effectively incorporate technology. This approach aims to address the diverse needs of students and potentially bridge the achievement gap among underserved communities. Research by Jung et al. (2019) emphasized the importance of motivation in successful technology integration in elementary classrooms. Arnett et al. (2018) further elaborated that teachers possess varied motivations to embrace instructional initiatives, ranging from content engagement, and student outcome enhancement, to time management. Educational leaders, including site administrators and peer leaders, are responsible for demonstrating the advantages of instructional technology, and encouraging their colleagues to embrace it.

The ramifications of the COVID-19 pandemic cannot be overlooked when considering the evolution of instructional technology and the education profession. Teachers now grapple with expanded responsibilities, necessitating adeptness in new instructional technologies and data analysis for effective teaching (Sokal et al., 2020). These increased demands highlight an urgent requirement for dedicated professional learning periods and collaboration opportunities. For teachers to effectively navigate this new landscape, district and site administrators must acknowledge and provide the essential resources for technological equipment and continuous professional development. As Kotter (2012) emphasized, the essence of leadership is the ability to adapt to change and encourage growth. The abrupt transition to distance learning associated with the pandemic forced teachers and students to acquire various technical skills (Yeigh et al.,

2020). However, with evolving curriculums and broader student needs, there is need for more resources and training. Leveraging the potential of technology may help alleviate teachers' stress and enhance student outcomes. Embracing the technical skills and confidence teachers and students gained during the pandemic can improve educational outcomes and facilitate the development of 21st-century learners.

Recommendations for Action

The transformation of the educational landscape, particularly in the aftermath of the COVID-19 pandemic, has emphasized the indispensable role of instructional technology. As educators and students grapple with the nuances of this digital integration, certain strategic actions can optimize learning outcomes and support teachers, which include professional development and collaboration, resource allocation and access, adaptive leadership, and emphasizing student outcomes.

Professional Development and Collaboration

The demands of contemporary teaching require educators to wield proficiency in their subject matter and the use of instructional technology. Sokal et al. (2020) articulated the crucial need for educators to be adept in new technological tools and the associated data analytics for efficacious teaching. To answer this need, educational institutions must prioritize comprehensive training. Comprehensive training would entail conducting frequent workshops and smaller training sessions that showcase relevant technologies and demonstrate their effective utility and classroom applications. Opportunities, such as conferences or specialized online courses in tech-driven pedagogy, can further bolster their skill set. Of particular importance is a collaborative environment with time away from instruction, to exchange knowledge, share innovative practices, and learn collectively, to expedite the implementation of instructional technology.

Resource Allocation and Access

The seamless application of technology within educational settings is contingent upon access to appropriate tools. Without robust technological infrastructure, even the most adept educators might be ill-equipped. To avoid this, district and site administrators must institute periodic audits of technological resources, ensuring their relevance and efficacy. Dedicated budgeting for updating and maintaining technology is paramount. Equally vital is the democratization of this access. Ensuring all students, especially those from underserved sectors, have unhindered access to technology can play a pivotal role in narrowing the achievement gap (Alanoglu et al., 2022).

Thoughtful integration of appropriate technological solutions can alleviate some obstacles educators face (Arnett, et al, 2018). This means choosing systems that minimize administrative burdens, thus giving educators valuable time and energy. Recognizing the emotional and psychological strains of adapting to a technology-integrated educational landscape is also vital. Schools should actively provide support structures, encompassing platforms for collegial interaction. While the post-pandemic educational world comes with its set of challenges, it also presents unique possibilities. With thoughtful strategies and a focus on student needs, educational institutions can harness instructional technology to create enriched, accessible, and enhanced 21st-century educational experiences for students and educators. The narrative inquiry provides a lens to the discourse on instructional technology, offering actionable insights for future applications. To ensure the effective integration of technology into educational practices, it is crucial for educational institutions to equip educators with adequate time, resources, and continual support. Additionally, fostering a collaborative and reflective

environment among educators within the organization is paramount to ensure technology is a catalyst for educational evolution and improved student outcomes.

Adaptive Leadership

The post-pandemic era offers an opportunity to reflect and innovate. Drawing inspiration from Kotter (2012), who extols the virtues of adaptability, and growth in leadership, educational institutions stand at a juncture where they can harness the technical acumen educators and students accrued during the pandemic (Yeigh et al., 2020). Embedding technological skills into the academic framework, encouraging pedagogical experimentation with technology, and fostering a culture where educators mentor and guide one another in this digital journey.

Emphasizing Student Outcomes and 21st-Century Skills

The focus of any instructional strategy, technologically based or otherwise, remains to enhance student outcomes. Technology offers the unparalleled advantage of personalizing these learning trajectories. It is imperative for institutions to weave in solutions catering to individual students' needs, harnessing the power of data-driven informed instruction and decision-making to continuously refine these strategies (Yeigh et al., 2020). Teachers can also employ tools to monitor student advancement and identify areas requiring targeted instruction.

A vital approach lies in the integration of collaborative strategies and fostering 21st-century skills (Framework for 21st Century Learning, 2019). With its ability to personalize learning trajectories, instructional technology offers an advantage in this endeavor. Educational institutions should emphasize collaborative platforms and tools that enable collective problem-solving and shared learning experiences. By integrating collaborative technologies, students can engage in cooperative projects, exchange ideas, and develop critical thinking, communication, and teamwork skills. Leveraging data-driven insights through these platforms allows educators to

tailor instruction to individual students' needs, ensuring a personalized learning experience within collaborative experiences. This integration dually refines teaching strategies based on real-time data and fosters a collaborative learning culture, aligning with the ever-evolving educational landscape.

Recommendations for Further Study

The domain of instructional technology is expansive and continuously evolving, with numerous avenues to explore. The narrative inquiry conducted in this study provides a valuable perspective on instructional technology to offers actionable steps for future applications. Drawing insights from the limitations, delimitations, and ethical issues highlighted in the qualitative narrative study, the following recommendations are made for future research. The limitation of a small and specific sample size in this study highlights the need for a wider lens in future research. Including a more diverse participant pool, spanning various grade levels, geographical locations, and teaching experiences, can provide more comprehensive insights and elevate the generalizability of conclusions.

One pivotal area requiring thorough research is the cognitive impact of prolonged screen time, particularly within educational contexts. Recent research on the impact of excessive screen time on young children has gained the attention of stakeholders and warrants further research specific to the impact of the increased use of digital tools in academic settings (Mayo Clinic Health System, 2021). Researchers should investigate the comparative cognitive outcomes when students engage with digital materials compared to traditional materials. Understanding the cognitive implications of digital exposure to curricular materials is vital for shaping effective strategies for educational technology use.

Additionally, integrating artificial intelligence (AI) within educational paradigms presents an exciting area for exploration. Future research should analyze whether and how AI-driven education tools may be adopted and their efficacy in enhancing student outcomes. Ethical considerations regarding AI use in classrooms, including data privacy, potential algorithm biases, and long-term effects on students, also need comprehensive exploration. A recent article by Mollick and Mollick (2023) offers guidance on employing artificial intelligence (AI) to enhance teaching strategies effectively within classrooms. The authors outlined five evidence-based teaching strategies that often face challenges within practical application, due to time and resource constraints, which include presenting multiple examples and explanations, identifying and addressing student misconceptions, regular low-stakes assessment, evaluating student learning, and implementing distributed practice or spacing out learning practices over time. The authors advocated for the potential of AI in aiding educators to implement these strategies by creating supportive materials and enhancing student learning, (Mollick and Mollick, 2023). They provide instances of AI utilization to bolster each strategy, along with a discussion on this approach's potential benefits and risks. The article concludes by emphasizing that AI can significantly amplify instructors' efforts, acting as a "force multiplier," provided it is thoughtfully and cautiously integrated to align with evidence-based teaching practices (Mollick & Mollick, 2023).

In addition to artificial intelligence, the burgeoning variety of instructional technologies available to educators necessitates the establishment of standardized evaluative frameworks. Future research could focus on crafting comprehensive methodologies to evaluate the myriad of learning technologies available. Rubrics designed for evaluating digital tools exist in higher education, but are lacking in primary and secondary settings. Further research could explore the

various aspects and criteria that can be employed to assess the effectiveness and suitability of instructional tools for educational purposes, aiding educators in making informed decisions about their integration into teaching and learning practices (Nunley & Ingram, 2018).

Addressing potential biases in future research is crucial. Future studies might consider leveraging third-party interviewers or deploying anonymous survey techniques to ensure authentic responses without predisposed biases. Finally, in tech-intensive educational environments, ethical considerations become increasingly critical. Future research should focus on understanding and ensuring the confidentiality and security of both student and teacher data, particularly in an AI-predominant educational landscape. The realm of instructional technology presents numerous research possibilities, and through meticulous exploration, researchers aim to harness the potential of technology to craft enriched educational experiences.

Conclusion

The purpose of this qualitative narrative inquiry was to understand the experiences of third-grade through fifth-grade teachers regarding the implementation of instructional technology in their classrooms. The study's timeframe holds significant relevance as it encompassed teachers' viewpoints on instructional technology across the phases before, during, and after the 2020-2021 academic year. This period was notably marked by extensive reliance on instructional technology due to the prolonged distance learning necessitated by the COVID-19 pandemic. The COVID-19 pandemic exacerbated societal disparities and affected academic performance and social well-being, particularly among vulnerable students (Alanoglu et al., 2022; Law et al, 2023; Ong, 2020). Mitigating the negative impacts requires effective technology integration, ongoing professional development, collaboration, data-informed instruction, and specialized tools to support educators and students.

Using qualitative narrative inquiry provided an in-depth exploration of teachers' experiences with instructional technology in search of answers to the following research questions: Research Question 1: How do third-grade through fifth-grade general education teachers in Northern California describe their teaching experiences implementing instructional technology? Research Question 2: How do third-grade through fifth-grade general education teachers in Northern California describe their experiences teaching with instructional technology for student learning?

The findings of this study shed light on instructional technology use and provided crucial insights for shaping its future application in third-grade through fifth-grade classrooms. These insights guide future research, urging investigations into the cognitive effects of digital exposure, the potential of integrating artificial intelligence in education, and the necessity of evaluative frameworks for instructional tools. The implications of the narrative inquiry highlight the need to equip teachers with sufficient time, resources, and collaborative opportunities, ensuring they can effectively implement instructional technology with meaningful outcomes for their practice and student learning. The teachers' narratives in this study serve as a valuable resource for informing and directing further research concerning instructional technology in upper elementary educational settings.

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APPENDIX A

RECRUITMENT E-MAIL

Hello! My name is Erin Layng, the Principal Investigator of the qualitative research entitled, ***"Examining Elementary Educators' Lived Experiences: Implementing Instructional Technology to Enhance Third-Grade through Fifth-Grade Student Learning."*** *This research is being conducted in pursuit of my doctoral degree program at the University of New England.*

Purpose: The purpose of this qualitative narrative inquiry is to understand the experiences of third-grade through fifth-grade teachers' perspectives and perceptions of the use of instructional technology in their teaching practice and for student learning. The study aims to explore teachers' perspectives and perceptions of instructional technology use in their teaching practice and for student learning.

Research Procedures Involved: Participation in this research is voluntary. Interested individuals will contact me (Principal Investigator) directly via the email address provided below. A Participant Information sheet and a schedule to set up an interview will be sent back to the volunteer by the Principal Investigator. A notification of non-select will be sent out to the rest of the eligible participants once the nine participants have been identified by the Principal Investigator. If selected to participate in the study, participants will schedule and attend one virtual interview using Zoom videoconferencing platform with the Principal Investigator. This virtual interview will last approximately 45 minutes in length and will be recorded for transcription purposes. Each participant will be provided five calendar days to review their transcribed narrative as retold by the Principal Investigator for accuracy and revisions as needed.

Confidentiality is an essential component of this study. For participants to feel comfortable being transparent, pseudonyms for participants will be used to minimize risk and

protect privacy. Any data obtained during the interview will be kept confidential and used for the sole purpose of the study. All field notes, transcriptions, and recordings will be deleted and/or destroyed upon completion of the study. The confidentiality of participants will be protected throughout the course of the study, with names and identifying information replaced with pseudonyms on all any material generated from the interviews. Names, emails, transcriptions, and field notes will be stored on a password-protected computer, accessible only by the researcher.

Who: You are eligible to participate in this research if each of the following is true:

- You are a third, fourth, or fifth-grade general education teacher.
- You hold an active multiple-subject teaching credential from the California Commission on Teacher Credentialing.
- You are employed as the teacher of record with the study site for the 2023-2024 academic year.

If you do not meet the criteria stated above, you are not eligible to participate in this study.

Why: By sharing your story, you may help other educators, administrators, and students become aware of the uses of instructional technology in teaching and student learning.

How: If you are interested in potentially participating in this study, please contact me by emailing me at: elayng@une.edu within seven calendar days. I appreciate your cooperation and support as I examine the topic of instructional technology in upper elementary classrooms.

APPENDIX B

INTERVIEW PROTOCOL

Possible Prompts:

Describe your experience as a classroom teacher utilizing instructional technology during the course of your day.

How do you utilize instructional technology outside of instructional hours?

What types of programs do you use to facilitate collaboration and communication with colleagues and families? Please describe your use of those programs.

What types of programs do you use to facilitate student learning? Please describe your use of those programs.

What types of instructional technology do you use to facilitate student accessibility? Please describe your use of that technology.

How has distance learning, if at all, affected your proficiency with instructional technology?

Describe the challenges and opportunities of utilizing or attempting to utilize instructional technology. Are these challenges, opportunities, or successes connected to anything in particular or in general?

What contributing factors do you connect to the success or challenges of using instructional technology?

Describe the evolution of your use of instructional technology since 2020.

APPENDIX C

UNIVERSITY OF NEW ENGLAND PARTICIPANT INFORMATION SHEET

Version Date:	6-29-23
IRB Project #:	0623-07
Title of Project:	DIGITAL JOURNEYS: A NARRATIVE INQUIRY INTO THE EXPERIENCES OF THIRD-GRADE THROUGH FIFTH-GRADE GENERAL EDUCATION TEACHERS IMPLEMENTING INSTRUCTIONAL TECHNOLOGY IN NORTHERN CALIFORNIA
Principal Investigator (PI):	Erin Layng
PI Contact Information:	elayng@une.edu (925) 330-1307

INTRODUCTION

- This is a project being conducted for research purposes. Your participation is completely voluntary.
- The intent of the Participant Information Sheet is to provide you with important details about this research project.
- You are encouraged to ask any questions about this research project, now, during or after the project is complete.

- The use of the word ‘we’ in the Information Sheet refers to the Principal Investigator and/or other research staff.

WHAT IS THE PURPOSE OF THIS PROJECT?

The purpose of this study is to explore the lived experiences of third grade through fifth grade teachers related to the implementation of instructional technology. Twelve participants will be invited to participate in this research as part of the principal investigator’s dissertation research.

WHY ARE YOU BEING ASKED TO PARTICIPATE IN THIS PROJECT?

You are being asked to participate in this research project because you are 18-years old or older and have fulfilled the following selection criteria:

5.) You are a third, fourth, or fifth grade general education teacher.
6.) You hold an active multiple-subject teaching credential from the California Commission on Teacher Credentialing.
7.) You are employed as the teacher of record with the study site for the 2023-2024 academic year.
8.) You have at least 3 years of teaching experience prior to the 2023-2024 academic year.

WHAT IS INVOLVED IN THIS PROJECT?

- You will be asked to participate in a semi-structured interview with the principal investigator that will last approximately 45-minutes over Zoom. The interview will be conducted in a location of your choosing and will be recorded for transcription purposes. Participants and PI (Principal Investigator) will be located in rooms/offices away from public access.
- You can choose a pseudonym to be used in place of your name for the study.
- You will be given the opportunity to leave your camera on or off during the interview, and your interview will be recorded using Zoom.
- You will be emailed a copy of your restoried narrative to review for accuracy. You will have five calendar days to review the story (narrative) for accuracy and provide revisions as needed. If there is no communication from you during the 5 days given to provide adjustments, the story (narrative) will be considered as accurate.
- If requested, the results of the project will be shared with site leadership, and any data to be shared will be de-identified and presented in aggregate.

WHAT ARE THE POSSIBLE RISKS OR DISCOMFORTS INVOLVED FROM BEING IN THIS PROJECT?

The risks involved with participation in this research project are minimal and may include an invasion of privacy or breach of confidentiality. You have the right to skip or not answer any questions, for any reason.

Please see the 'WHAT ABOUT PRIVACY & CONFIDENTIALITY?' section below for steps we will take to minimize an invasion of privacy or breach of confidentiality from occurring.

WHAT ARE THE POSSIBLE BENEFITS FROM BEING IN THIS PROJECT?

There are no likely benefits to you by being in this research project; however, the information we collect may help us understand the experiences of doctoral committee members when advising doctoral candidates.

WILL YOU BE COMPENSATED FOR BEING IN THIS PROJECT?

You will not be compensated for being in this research project.

WHAT ABOUT PRIVACY AND CONFIDENTIALITY?

We will do our best to keep your personal information private and confidential. However, we cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Additionally, your information in this research project could be reviewed by representatives of the University such as the Office of Research Integrity and/or the Institutional Review Board.

The results of this research project may be shown at meetings or published in journals to inform other professionals. If any papers or talks are given about this research, your name will not be used. We may use data from this research project that has been permanently stripped of personal identifiers in future research without obtaining your consent.

- Data will only be collected during one-on-one participant interviews using Zoom, no information will be taken without your consent, and transcribed interviews will be checked by you for accuracy before they are added to the study.
- Pseudonyms will be used for all participants and any personally identifying information will be stripped from the interview transcript.
- All names and e-mails gathered during recruitment will be recorded and linked to a uniquely assigned pseudonym within a master list.
- The master list will be kept securely and separately from the study data and accessible only to the principal investigator.
- The interview will be conducted in a private setting to ensure others cannot hear your conversation.
- You will be given the option to turn off your camera during Zoom interview.
- After you have verified the accuracy of your restoried narrative the recorded Zoom interview will be destroyed. Once all transcripts have been verified by the participants of this project, the master list of personal information will be destroyed.
- All other study data will be retained on record for 3 years after the completion of the project and then destroyed. The study data may be accessed upon request by representatives of the University (e.g., faculty advisors, Office of Research Integrity, etc.) when necessary.

- All data collected will be stored on a password protected personal laptop computer accessible only by the principal investigator.

WHAT IF YOU WANT TO WITHDRAW FROM THIS PROJECT?

You have the right to choose not to participate, or to withdraw your participation at any time until the Master List is destroyed without penalty or loss of benefits. You will not be treated differently if you decide to stop taking part in this project.

If you request to withdraw from this project, the data collected about you will be deleted when the master list is in existence, but the researcher may not be able to do so after the master list is destroyed.

WHAT IF YOU HAVE QUESTIONS ABOUT THIS PROJECT?

You have the right to ask, and have answered, any questions you may have about this research project. If you have questions about this project, complaints, or concerns, you should contact the Principal Investigator listed on the first page of this document.

WHAT IF YOU HAVE QUESTIONS ABOUT YOUR RIGHTS AS A RESEARCH PARTICIPANT?

If you have questions or concerns about your rights as a research participant, or if you would like to obtain information or offer input, you may contact the Office of Research Integrity at (207) 602-2244 or via e-mail at irb@une.edu.

APPENDIX D

IRB EXEMPTION LETTER

UNE UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

Office of Research Integrity
Institutional Review Board

Biddeford Campus
11 Hills Beach Road
Biddeford, ME 04005
(207) 602-2244 T
(207) 602-5905 F

Portland Campus
716 Stevens Avenue
Portland, ME 04103

DATE OF LETTER: June 29, 2023

PRINCIPAL INVESTIGATOR: Erin Layng
FACULTY ADVISOR: Dorothy Williams, Ph.D.

PROJECT NUMBER: 0623-07
RECORD NUMBER: 0623-07-01

PROJECT TITLE: EXAMINING ELEMENTARY EDUCATORS' LIVED EXPERIENCES: IMPLEMENTING INSTRUCTIONAL TECHNOLOGY TO ENHANCE THIRD THROUGH FIFTH GRADE STUDENT LEARNING

SUBMISSION TYPE: New Project
SUBMISSION DATE: June 28, 2023

ACTION: Determination of Exempt Status
DECISION DATE: June 29, 2023

REVIEW CATEGORY: Exemption Category # *2ii*

The Office of Research Integrity has reviewed the materials submitted in connection with the above-referenced project and has determined that the proposed work is exempt from IRB review and oversight as defined by 45 CFR 46.104.

You are responsible for conducting this project in accordance with the approved study documents, and all applicable UNE policies and procedures.

If any changes to the design of the study are contemplated (e.g., revision to the research proposal summary, data collection instruments, interview/survey questions, recruitment materials, participant information sheet, and/or other approved study documents), the Principal Investigator must submit an amendment for review to ensure the requested change(s) will not alter the exempt status of the project.

If you have any questions, please send an e-mail to irb@une.edu and reference the project number as specified above within the correspondence.

Best Regards,

Bob Kennedy, MS
Director of Research Integrity