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What drives educators: a mixed methods study on the impact of motivations and attitudes on technology integration practices in the K-8 classroom setting

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WHAT DRIVES EDUCATORS: A MIXED METHODS STUDY ON THE IMPACT OF MOTIVATIONS AND ATTITUDES ON TECHNOLOGY INTEGRATION PRACTICES IN THE K-8 CLASSROOM SETTING

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by

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This dissertation, written by

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DEDICATION

To my best friend and husband, Rupert,

your love and support drive me to be a better person.

I would be lost on this journey without you.

To my sweet mom, Lynne,

I am thankful for the time that we had together.

I wish you were here to see me finish what I started all those years ago.

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VITA

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ABSTRACT

Due to the rapid pace at which emerging technologies are evolving, many educators feel apprehensive toward shifting their pedagogy to stay relevant with technology adoption practices and 21st Century learning expectations. There is limited research connecting the adoption practices of early and late adopters to individual inherent motivational preferences. The goal of this multi-phase sequential explanatory mixed methods study sought to produce detailed findings of early and late adopters' tendencies and establish a connection to their motivation and integration practices. Additionally, this research sought to discover the impact that attitudes and perceived/actual barriers have on resistance to technology integration.

K-8 certificated public elementary educators ($N = 172$) across the United States participated in an online survey designed to measure their motivations, attitudes, and technology integration practices. Eight individuals participated in a follow-up individual virtual interview for in-depth discussion regarding their experiences and frustrations with integrating technology into their instructional practices. Findings substantiated the researcher's claim that intrinsically motivated individuals often display early adopter tendencies; being highly ambitious self-directed problem solvers who value innovation. Five main thematic categories with 22 subthemes emerged from the analysis of open-ended survey items and interview transcripts including attitudes toward adoption; barriers/challenges to integrating technology; student learning through technology; technology support systems; and technology integration practices.

Triangulation of findings resulted in four conclusions: intrinsic motivation plays a more significant role than extrinsic motivation for technology integration; the perception of a steep learning curve confounds the adoption process of innovative practices; generational stereotypes

continue to impede the integration of technology in the classroom; and the reality of rapidly evolving technology continues to disrupt integration efforts.

Findings contribute to existing literature by providing insights into how limiting beliefs manifest in motivational patterns and resistance to adoption. Recommendations for future research include investigating current professional development practices and the underutilization of teacher supports, exploring how to minimize the effects of generational stereotypes, studying self-directed learners and their preferred learning processes, observing pedagogical practices in real-time, and exploring the effects of the COVID-19 pandemic on motivational patterns and technology integration practices of educators.

Key Words: adoption practices, barriers, digital divide, early and late adopters, emerging technologies, innovation, intrinsic and extrinsic motivation, technological disruption, self-directed learning, technology integration.

Chapter One: Introduction

> Imagine a classroom full of excited elementary school students ready to learn about a new concept, expecting to not only learn from books but also conduct research on the internet. These children were practically born with electronic devices in their hands and are well-adept at quickly leveraging an unlimited amount of information at their very fingertips. These are 21st Century digital learners; fully engaged in a virtual world light years' ahead of many individuals their senior. Flipping through a musty encyclopedia, hurriedly scribbling information onto a piece of paper as they read is a foreign concept and an inefficient task to them; their attention spans are quite shorter than their predecessors. Standing in the center of the classroom is an educator; one who is late to the technology game; well out of her comfort zone and handicapped by her limited technology implementation skills. She realizes that she's among the thousands of educators nationwide that are latecomers to the technological disruption of the American classrooms. A virtual fish out of water.
>
> Vignette #1

Problem Statement

Information technology for learning, education, and training[1]; more commonly referred to as *Educational Technology* is widely believed among educators to be a crucial component to a successful learning environment. However, almost two-thirds of the 4,300 educators interviewed nationally admitted to being late adopters and having no idea how to best implement technological devices, digital learning tools, or resources into their daily repertoire despite over $4.7 billion dollars spent in 2015 on educational technology in the K-12 school systems (McCarthy, 2015; Murphy, 2016). In an environment where everyone born after 1983 have never known a world without technology[2], it is crucial now more than ever that educators make the

[1] According to the international technology standards as developed by the International Organization for Standardization (International Organization for Standardization, 2019).
[2] In this case, the invention of technology is referring to the development of the personal computer, first by IBM in 1981 then by Apple in 1983.

necessary technological adjustments to their repertoire so as not to become archaic in their pedagogy. Many believe that these individuals learn in a completely different manner than those born prior to the invention of the computer (Prensky, 2001). According to Corsten (1999) and Kupperschmidt (2000), a generation is defined as an identifiable group of individuals sharing commonalities in birth years, age, and significant events occurring at critical junctures of human development. Additionally, beliefs, attitudes, experiences, and memories from youth provide a lens through which current and future adult experiences are filtered creating an imprint (Lovely, 2012). Three generations make up the current educator population: Baby Boomers, Generation X, and Millennials. Lovely (2012) argues, "when combined with pedagogical knowledge, a teacher's generational imprint can have a lasting impact on professional commitment, self-efficacy, and shared responsibility;" and in this case, the adoption and integration of technology in the classroom setting (p. 57). In a workplace environment such as the educational services sector, where multiple generations comprise the entirety of the adult workforce, generational stereotypical attitudes continue to abound among educators.

Since the evolution of technology in its entirety is not likely to decline in the foreseeable future, the urgency at which the pedagogical methods in teaching need to shift to keep up is alarming. Weston (2013) believes that before understanding the role educational technology plays in supporting educators and learners; one must have a firm understanding of the nature of pedagogy as a whole. Furthermore, from the plethora of research conducted over the past 60 years, Clark and Mayer (2011) argue that little change will result in learning when the instructional methods used to deliver instruction, regardless of medium, remain the same. Lee and Winzenried (2009) assert "the lack of impact of technological [devices and resources] in

schools would not be a problem if there were not an urgent need for the successful education of all students" (p. ix). For all the good that educational technology has to offer, it only creates more pitfalls when it is not properly aligned to how individuals currently learn; a detriment to the various types of student learners we have occupying our classrooms as of late. Therefore, in order to fully understand the apprehensions regarding late adopter educators' resistance to adopt technological innovation into the classroom setting; it is necessary for further research to identify and determine both the intrinsic and extrinsic motivators that educators experience coupled with their barriers to success and effects of their overall attitudes towards technology adoption in the classroom setting; especially since Vallerand et al. (1992) argue that motivation is recognized as being one of the most significant psychological concepts to date in education.

Educators have access to thousands of digital tools and resources, such as: applications (apps), games, software, and devices that are ready to use; but are often left underutilized effectively rendering them obsolete while users aimlessly wander about, overwhelmed by the daunting task of navigating the inevitable learning curve and becoming competent users (Murphy, 2016). Not only that, but a successful digital conversion in a classroom setting is not measured by the amount or type of technology present, but how it is leveraged to enable a shift in teaching and learning (McKnight et al., 2016). Richardson (2013) believes that it is essential for educators to be technologically savvy by using devices to enhance student learning in order to effectively teach 21st Century digital learners (Battelle for Kids, 2019a; Illinois Institute of Design, 2007).

It is not enough for educators to have the understanding of how best to deliver a lesson. Successful educators are defined by their ability to wield technology, specifically digital tools

and resources, in such a manner that meet the needs of modern learners while delivering impactful and purposeful education to students thereby enhancing the overall learning experience (Office of Educational Technology, 2017; U.S. Department of Education, 2020). The urgency at which educators need to shift their way of instruction so as not to become archaic in their instructional repertoire stems from Seymour Papert's (1996) belief that,

> Across the world there is a passionate love affair between children and computers...and more than wanting [computer technology], they seem to know that in a deep way it already belongs to them. They know they can master it more easily and more naturally than their parents. They know they are the computer generation. (p. 1)

Framework for 21st Century Learning. As the new century approached, a not-for-profit organization called Partnership for 21st Century Skills (or P21) was founded by a coalition of businesses, educational leaders, and key policymakers[3] as a way to start a national conversation on the importance that all students are equipped with 21st Century skills (National Education Association, 2019; Partnership for 21st Century Skills, 2009). The partnership was chaired by then NEA Executive Director John Wilson and focused on encouraging states to infuse technology into education in their school districts and schools. Battelle for Kids, also a national not-for-profit organization committed to supporting school districts and communities infuse 21st Century skills into education, was founded by a grant from Battelle Memorial Institute and established in 2001 by the Ohio Business Roundtable to improve student achievement. Since then it has significantly grown to encompass school systems and communities nationally. In 2018 P21 and Battelle for Kids merged to create the Partnership for 21st Century Learning: A

[3] Some key coalition organizations include NEA, US Department of Education, AOL Time Warner Foundation, Apple Computer Inc., Cable in the Classroom, Cisco Systems, Inc., Dell Computer Corporation, Intel Foundation, Oracle Education Foundation, Microsoft Corporation, SAP, Verizon, American Association of School Librarians, American Federation of Teachers, Educational Testing Service, and Pearson Education (National Education Association, 2019).

Network of Battelle for Kids (Battelle for Kids, 2019a). Their updated vision states "deeper learning occurs through the powerful integration of rigorous academic content with experiences that intentionally cultivate skills, [attitudes], and literacies essential for students to become lifelong [digital] learners and contributors in the 21st Century" (Battelle for Kids, 2019b, para. 4) through the support and collaboration of students, families, educators, businesses, and community members alike.

A framework was developed to support in facilitating this effort which was updated in 2019 when P21 merged with Battelle for Kids. The Framework for 21st Century Learning consists of student outcomes and educator support systems outlining the necessary skills and knowledge students require in order to lead successful 21st Century digital lives in our current social climate (Battelle for Kids, 2019a). The framework has since become a mainstay in the educational world as a foundation by which educators approach their craft and schools structure their processes to properly support the needs of their current student body of digital learners. School systems have begun aligning their curriculum to coincide with this framework's tenets; coupling them with the National Education Technology Plan (NETP17) and the International Society for Technology in Education standards (Office of Educational Technology, 2017; Roscorla, 2016).

The student outcomes include four key components: Life and Career Skills; Learning and Innovation Skills; Information, Media, and Technology Skills; and Key Subjects. The Learning and Innovation Skills include the National Education Association's *Four C's of Critical Thinking, Communication, Collaboration, and Creativity* (Office of Educational Technology, 2017). The Key Subjects domain include the three R's *reading, writing,* and *arithmetic* and the

21st Century Themes of Global Awareness; Financial, Economic, Business, and Entrepreneurial Literacy; Civic Literacy; Health Literacy; and Environmental Literacy. The support systems used by educators encompass four tiers of focus are: Standards and Assessments, Curriculum and Instruction, Professional Learning, and Learning Environments.

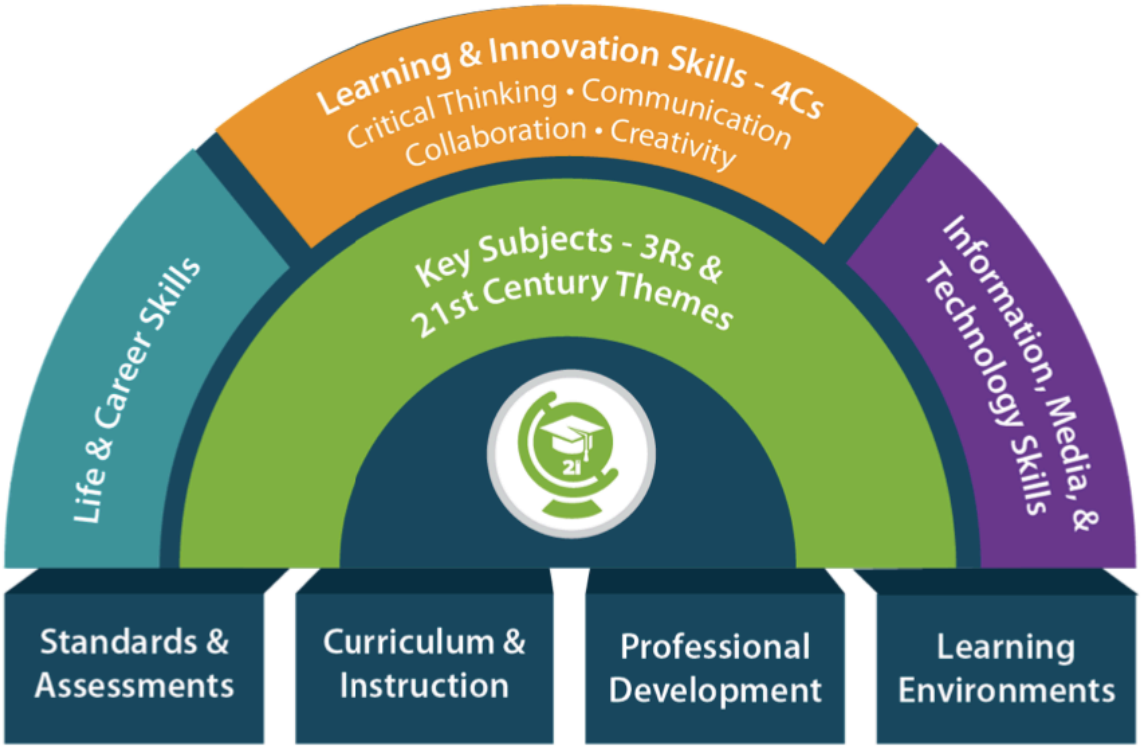


Figure 1. Framework for 21st Century Learning. Reprinted with permission of *Battelle for Kids and the Partnership for 21st Century Learning*. © 2019a, Partnership for 21st Century Learning, a network for Battelle for Kids. All Rights Reserved, reprinted with permission.

Adoption of New Technologies. Rogers (2003) believes that individuals within a social construct, in this case educators, do not adopt an innovation at the same pace as their counterparts. Rather, he purports that people fall within five classes or categories based on the degree of their innovativeness towards a new technology or concept. The innovators typically represent less than 3% of the group with early adopters representing about 14%. The largest group of individuals fall in either the early or late majority, each representing about 34%,

respectively. Rogers (2003) argues there will always be those (about 16%) who are the most resistant to the adoption; these individuals are referred to as late adopters. Each classification of adopter presents with a unique set of ideals and values based on their preconceived experiences and opinions with adopting past innovations; meaning there is a direct connection between the more willing a participant they are at adopting innovation and adapting to change the more positive their experiences were in the past. Furthermore, the opposite holds true; their level of unwillingness to be a participant in adopting innovation and adapting to change is directly proportional to the amount of negative experiences they had in the past. This is not to say that every individual reacts the same way, situations are as unique as the individuals who experience them; however, Rogers (2003) believes that in most cases these results are found to be true. Similarly, if early adopters dismiss an innovation, regardless of reason, the more socially connected early majority may never be made aware of it; thus, halting the diffusion of innovation altogether (Moore, 1999).

Innovativeness is attributed to the level in which individuals change, evolve, or adopt new ideas (Rogers, 2003). In this case, innovativeness will be equated to the rate of adoption of a technological idea or device in an educational setting. Rogers' (2003) model is relevant to the educational setting in that his tenets are applicable to the factors associated with the adoption rate of technology in the classroom. Conyers and Wilson (2016) argue Rogers' model applies to education in the following five factors: (a) how teachers and administration perceive the advantages of a new innovation or idea in comparison to the status quo currently experienced by the staff; (b) is this new idea compatible with current practices and professional values; (c) if this new idea or innovation is complex in nature and structure, how can it be presented in relatable

and relevant terms to elicit investment from staff; (d) can experimentation occur prior to the adoption of this new idea or innovation; and finally, (e) are the results and changes observable to the staff thus stimulating embracement of the new innovation by staff. As with Rogers' model, the tipping point is where the accumulation of small changes occurs by early adopter advocates triggering faster momentum of acceptance and usage; ultimately resulting in the adoption of the new innovation into educational practices. Conyers and Wilson (2016) argue:

> This issue is at the heart of transformational teaching; finding ways to move effective educational practices and initiatives past the tipping point into the realm where teachers, administrators, and policymakers acknowledge their positive impact and agree on the need to integrate them into school systems. (p. 71)

While Rogers' (2003) adoption model speculates about an individual's readiness to adopt innovation, it doesn't consider how individuals actually reach the decision to adopt change. Conyers and Wilson (2016) purport the way to reach individuals resistant to change is by providing them with clarity, demonstrating the observable benefits found within research and practice. Additionally, seeking out and eliciting the support of change makers such as technologically savvy early adopters to support innovation and influence colleagues helps to marshal movement and innovation. Advocating for policy and procedural changes while engaging social networks are also recommended by Conyers and Wilson (2016) to foster transformational teaching through innovative technology-based practices.

When first introduced to a new concept or idea, Maeli (2016) believes individuals begin the process of sequentially progressing through five stages to either accept or reject change. All individuals, regardless of location on Rogers' (2003) adoption curve, pass through five psychological stages: knowledge; persuasion; decision; implementation; and confirmation.

In an attempt to better understand how and why individuals move through these categories, Seth Godin (2015) created an idea progression model which suggests that people approach ideas based on their differing attitudes toward innovation and how those attitudes affect overall adoption of the trend or idea. While Rogers' (2003) Adoption Curve focuses primarily on the individual's level of innovativeness, the emphasis of the Idea Progression Model is on the gradual growth and adoption of an idea or trend as the idea progresses through six stages. Stage 1 is *fringe* and the final stage (Stage 6) is *always*. In his model, Godin (2015) explains when an idea starts out it is considered on the fringe; not proven or obvious to anyone and few, if anyone, readily moves to adoption and usage. These would be equivalent to Rogers' innovators. As a small group of people become interested in the idea, adopt, and implement the fringe idea, they become known as innovators and the idea moves from fringe to *risky*. The idea continues to grow as more and more individuals begin to adopt and the idea becomes more widely accepted passing through the stages of *new, hot,* and *mass* embracing Rogers' *early and late majorities* along the way. When the late majority begins to adopt is when the new idea hits critical mass (Matzler, Mooradian, & Fuller, 2014; Oreg & Goldenberg, 2015). Eventually, even Rogers' late adopters accept which represent Godin's stage of *always*. The length of time it takes for late adopters to adopt innovation can result in missed opportunities, less time for efficiencies, and opportunity losses. Godin's model demonstrates how an idea itself impacts people as it moves from *fringe* to *always*; where eventually everyone, including late adopters make the change and adopt the idea as if it has always been a part of their lives. From the invention and usage of cell phones and laptops to the mass adoption of social media applications, all things, especially technology-based ideas, eventually become universal in nature.

In order for today's educators to stay ahead of their 21st Century digital students they must evolve at a faster pace in order to deliver impactful instruction (Prensky, 2001). Educators who are adopting technological advances have a greater impact on a child's learning experience by keeping them engaged for a longer period of time. This engagement sharpens skills and adds to prior knowledge to help the students make connections to what they are learning while fostering a greater desire to be active participants in their own educational experience. These types of educators are known as *early adopters* or *innovators* and are generally individuals who are intrinsically motivated (Prensky, 2001). This is demonstrated by being technologically savvy, progressive, coachable, and self-directed problem solvers. Since age is not a qualifier of the level of motivation they possess, these individuals also cross generational barriers. Additionally, they are willing to spend countless hours of their own time; learning, researching, developing, and perfecting lessons that are not only innovative, rigorous, and standards-based, but infused with technology specifically designed to engage their digital learners. Neil Postman (1998), an American author believes that technology is ecological in nature; that it changes everything. As such, the introduction of technology into our society has shifted the way individuals think, react, research, and learn; it invariably changes the way we conduct our lives, the way we learn in classrooms, the way our brains function. As such, educators have the choice of being either willing or unwilling participants in the technological innovation movement; while their students are evolving at a rapid pace as a result of their placement in the technological evolution.

On the flipside, *late adopters* are typically resistant to change (Prensky, 2001); they come with preconceived fears and opinions of the proposed adoption as being one more new thing they are being asked to do. Late adopters tend to experience hesitation with implementing a new

technological device or program and either never do or do so at a much later time and slower pace than their early adopter counterparts (Sprenger, 2016). Late adopters eventually join in once a new program, device, or innovative idea has been well established with their colleagues (Oreg, 2003). However, individuals who are the last to adopt an innovation are the most resistant to change and require the most support and patience from those responsible in implementing the change (Oreg, 2003). According to Rogers (2003) late adopters are typically individuals that have either had negative experiences or opinions regarding past requests for innovation adoptions and have become more resistant to change for any future technological requests.

Motivation, both intrinsic and extrinsic in nature, influences whether one is an early or late adopter. Generally speaking, intrinsically motivated individuals are innovators, self-confident, are flexible, are risk-takers, and are open to critical feedback. They tend to experience less resistance with trying new things rarely letting fear of failure hold them back despite possibly experiencing unfavorable situations with technology integration in the past (Interaction Design Foundation, 2018). On the contrary, extrinsically motivated individuals are typically late adopters, resistant to change, experience negative attitudes towards adopting new practices, are highly critical regarding the value of a new program or device, and generally oppose most innovations. Late adopters often experience a high threshold of resistance to innovation because of limiting beliefs or past unpleasant situations which have led them to lose the desire to be intrinsically motivated (Interaction Design Foundation, 2018).

The Battelle Framework for developing 21st Century skills along with considering patterns for adoption of new technologies provide key foundations for this research (2019a). In addition, individual attitudes as a motivator or barrier and intrinsic and extrinsic motivation

theories will guide the exploration of a group of educators as they adopt and implement technology into their classrooms.

Purpose of Research

The purpose of this sequential explanatory mixed methods study is to explore individual teacher adoption patterns for implementing new technology into their classrooms. An initial survey of practicing K-8 elementary teachers from public schools nationally measuring their motivations, attitudes, and current and past technology integration practices will determine which of those teachers will be interviewed regarding motivators influencing their decisions for technology adoption. The initial Phase One survey is designed to capture both quantitative and qualitative formatted responses and the second phase of data gathering involves formal interviews. The goal of this study is to produce detailed findings of both intrinsic and extrinsic motivation patterns and describe educator's willingness and attitudes towards technology integration within the classroom setting.

Research Question

The overall central guiding question is: How does intrinsic and extrinsic motivation influence a teacher's decision to integrate technology in the classroom? This research question was addressed through exploration of two sub-questions:

1. How do individual attitudes impact technology usage in the classroom?
2. How does resistance to change and perceived or actual barriers affect an individual's ability to integrate technology?

These sub-questions are relevant in that an individual's willingness to adopt technology innovation can be impacted by his/her level of motivation and attitudes. Additionally, an

adoption process can be impeded by an individual's resistance to change as well as by perceived or actual barriers to integration.

Study Design

This study will involve a sequential explanatory mixed methods approach (Creswell, 2009). An electronic survey of K-8 public school educators conducted nationally will contain both quantitative and qualitative data. Based on survey responses, a specific subset of educators will be formally interviewed to provide a more in-depth understanding of the experiences they have with regards to integrating technology into their classroom and teaching repertoire.

Assumptions and Delimitations

As a credentialed educator of more than 19 years, it has been demonstrated to this researcher that technology innovations are generally viewed enthusiastically by some educators; that is, until they are expected to be implemented on a daily basis. Upon initial introduction to new technology, many of the software, devices, and processes tend to excite educators as a new and improved means to better support their students and streamline their work; especially with regards to the Framework for 21st Century Learning discussed earlier (Battelle for Kids, 2019a). Unfortunately, despite conveying some level of desire for integration; many educators commonly express difficulties with time management and a heavy workload that tend to dissuade them from readily integrating technology into their classroom and teaching repertoire. Other times, the learning curve required for mastery of a new technological innovation can potentially seem unsurmountable; thus, further supporting the continued resistance to change. While most teachers share common intrinsic motivators for educating children; how they react to either

perceived or actual barriers can ultimately impede the implementation process, levels of intrinsic or extrinsic motivation, and overall attitudes regarding the implementation process.

Theoretical Foundation

This study involves two main theoretical areas. The first are theories associated with both intrinsic and extrinsic motivation for adopting innovative practices or processes. Some of these include the specific theories of Maslow's Human Motivation Model (1954), Herzberg's Motivation-Hygiene Theory (1966), Deci and Ryan's Self-Determination Theory (2008, 2017), and Pink's Theory of Motivation (2011). The second main theoretical area involves the theories and models for integrating technological innovation into the classrooms to achieve 21st Century educational outcomes.

Key Definitions

The following definitions are organized alphabetically and by the two main theoretical areas of *motivation theory* and *technology integration*.

Motivation theory. The following key terminology are essential in the understanding of an individual's motivational actions, desires, and belief systems.

Amotivation. The idea that an individual has an absolute lack of impetus; a deficiency in energy, motivation or desire; and a complete loss of control over one's behavior (Ryan & Deci, 2000b).

Autonomy. The desire to be fully in control of one's own life and work; to be able to direct and dictate what occurs in one's own life. To be a fully present and motivated

participant. Autonomous individuals are said to be more creative thinkers experiencing more freedom to explore and try new things (Pink, 2011).

Competence. Often associated with the term Mastery. Competence is the desire to be motivated to learn, improve, and master new skills. Typical individuals who display competency skills are associated with possessing unlimited potential, who are intrinsic in nature, and are desiring to attain new levels of mastery for the sake of learning; whether personal or for the greater good (Pink, 2011).

Extrinsic motivation. External form of motivation is to engage or participate in a particular activity, assignment, or way of thinking for external rewards and not necessarily for personal reasons. The driving force in participation is often out of demand, obligation, or expectation for an external reward. Not to be confused with Intrinsic Motivation (Deci & Ryan, 2008).

Intrinsic motivation. Internal form of motivation is to engage or participate in a particular activity, assignment, or way of thinking for internally motivated reasons. The driving force for accomplishment is a personal goal for learning, satisfaction, enjoyment, or meaning. Not to be confused with Extrinsic Motivation (Deci & Ryan, 2008).

Locus of causality. Directly relating to an individual's perception of the cause for either success of failure in relation to participation in an activity, experience, performance, or competition. This perception is directly related to the individual's physical characteristics, such as skill or effort; or psychological characteristics, such as luck or outside influencers (Kent, 2006).

Locus of control. The belief that success or failure is directly caused by either internal (ability; IQ; physical, emotional, or psychological limitations) or external (experiences, others, or extenuating factors) reasons (Reeve, 2009; Wilson & Conyers, 2013).

Purpose. The desire to serve something larger than oneself. Purpose provides a driver for autonomy and mastery. Purpose-driven individuals are generally more productive, motivated, and fulfilled individuals; and are commonly devoid of actions solely focused on self-interest (Pink, 2011).

Relatedness. Often times associated with the term Purpose; individuals who experience relatedness typically believe that they are working towards something larger than themselves or the project in which they are engaged. These people are often hard-working, productive people who are highly engaged in their tasks. They find joy, purpose, and connectivity in their work; how they perform their tasks; and the way in which they interact with others (Pink, 2011).

Self-directed learning. The process by which individuals take initiative for themselves, either with or without support from others, in identifying and diagnosing their personal learning styles and needs. Self-directed learners also formulate their own goals, identify and seek after both human and material resources for support, and integrate appropriate learning and evaluation strategies into their knowledge acquisition processes. These individuals also actively seek out solutions to problems and challenges they encounter; also known as self-directed problem-solvers. Common traits indicative of intrinsically motivated early adopters (Knowles, 1975).

The four c's: Battelle for kids. The following key terminology are essential in the understanding each section of the Battelle for Kids Framework (2019a).

Critical thinking. A form of thinking, regardless of subject or context, that leads to an improved quality of thinking as a result of skillfully adopting and implementing common structural practices inherent in the thinking process and infusing intellectual criteria upon them. The first "C" in the Four C's in Education (Battelle for Kids, 2019a; Franken, 1993).

Communication. The process by which information is collaboratively shared or exchanged with others; to hear and be heard by one another. The second "C" in the Four C's in Education (Battelle for Kids, 2019a; Franken, 1993).

Collaboration. A common practice whereby individuals work closely together to participate in the exchange of information and resources with the expectation of producing a tangible product as a result of their shared collaborative efforts. The third "C" in the Four C's in Education (Battelle for Kids, 2019a; Franken, 1993).

Creativity. The tendency to use the imagination to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others, and entertaining ourselves and others. The fourth "C" in the Four C's in Education (Battelle for Kids, 2019a; Franken, 1993).

Five stages of technological adoption. Rogers argues that individuals typically experience five stages as they move through the technological adoption process.

Adoption stages. Rogers (2003) believes that individuals move through five stages when presented with the opportunity to adopt an idea. The following are explanations of each

of the five stages. *Stage 1 – Knowledge.* The process of learning about the existence and purpose of a new ideas and collecting information. *Stage 2 – Persuasion.* The act of becoming convinced of the validity and importance of an idea once sufficient analysis of the gathered *knowledge* has been conducted. *Stage 3 – Decision.* Once *persuasion* has been solidified; a decision has been reached resulting in an alignment and commitment to adopt the idea. *Stage 4 – Implementation.* The process of putting an adopted idea into practice. *Stage 5 – Confirmation.* After sufficient time has been allotted to the implementation of an idea a final assessment of the validity of an idea takes place; ultimately resulting in either the adoption or rejection of an idea.

Technological innovation. Key terminology defined below describe the characteristics of specific types of technology adopters.

Early adopter. Typically, the minority subgroup of a particular population who are otherwise known as innovators; first to try new ideas, concepts, devices, and software; and typically rely on their intuition and strong drive to learn. Early adopters enjoy the challenge of learning something new and have learned to leverage innovative ideas and acquired skills to suit their particular needs; thus, affording them a higher level of retention, potential for long-term usage, and motivation to continue learning and improving (Rogers, 2003).

Innovation. Any idea or concept that is newly introduced to an individual or organization and will become an important part of that individual's or organization's internal processes moving forward. In the case of this study, innovation can encompass an: idea, device, software, program, concept, standard, or strategy (Rogers, 2003).

Innovativeness. The degree to which an individual or organization adopts a new idea or concept; a behavioral change (Rogers, 2003).

Innovator. The first individual/s to adopt a new innovation, technology, program, or device within the organization or society; synonymously used with the term, ***Early Adopter.*** Most often experiencing an abundance of confidence and valuing intrinsic motivation (Rogers, 2003).

Late adopter. Typically, the majority of a subgroup of a particular population who are non-innovators; are generally fearful of trying something new. These individuals have disapproving attitudes toward innovation, are typically resistant to change, and are quick to fall behind the others; in this case, early adopters (Rogers, 2003).

Novice. Individuals who are new and therefore inexperienced at learning/participating in a sport, concept, idea, or technology. Otherwise known as a newbie or noob. Novices differ from late adopters in that a novice has just barely been introduced to the environment and who's path has yet to be determined. As the novice gains experience, he or she will invariably either join the early adopter or late adopter subgroup depending on prior experiences, attitudes, and propensity to being either intrinsically or extrinsically motivated by nature (Curry, Web, & Latham, 2016).

21st century digital learner[4]. Originally developed and designed by educators, educational experts, and business leaders to outline: (a) the skills and knowledge that modern students need in order to become successful 21st Century digital learners; and (b) the support systems that are provided by educators and schools to ensure students receive

[4] See Figure 1: P21 Framework for 21st Century Learning (Battelle For Kids, 2019)

the skills and knowledge necessary to be active and successful members of society (Battelle for Kids, 2019a).

Significance of Study

This research intends to identify the effects of intrinsic and extrinsic motivation on early and late adopter educators and its impact on technology integration in their educational repertoire. Additionally, this study intends to discuss the effects of how attitudes and inclinations impact an individual's ability to integrate technology into the classroom. School personnel need to have an understanding of how motivations, attitudes, and resistance impact their teachers. Being quick to recognize when someone has an expectation for external rewards can provide administration the ability to help their teachers effectively shift into being intrinsically motivated. This, in turn, helps nurture their teachers' internal reward systems while decreasing the overall percentage of late adopters at their site. This shift, according to a report conducted by the Center for American Progress (2009) allows for a higher return on investment on technology integration while lowering the percentage of late adopters sitewide. Schools with a higher percentage of early adopters typically have a higher rate of return on sitewide technology adoptions by their teachers with the least amount of resistance possible (Center for American Progress, 2009). Additionally, it is crucial for educators to recognize their own patterns of extrinsic motivations (fixed mindsets) and late adopter tendencies thereby allowing them to quickly shift to more intrinsically motivated (growth mindset) patterns and early adopter behavior; thus, resulting in improved work performance and integration of technology (Kazakoff & Mitchell, 2017). Lasting change is generally achieved when individuals are more intrinsically

motivated since there is no guarantee that external rewards will always be present in future situations (Ryan, 2012).

This study also intends to add to the general body of knowledge by discussing reasonings behind why a significant number of educators are resistant to change, why these perceived or actual barriers impede the integration process, and how it is manifested during the technology integration process in the educational setting. While there is a great deal of research with regards to resistance to change and barriers to integration in the educational setting, little research has been conducted into the reasons why educators experience these limiting beliefs (Shifflet & Weilbacher, 2015). Additionally, one of the main reasons why this research is significant is that it will study these issues through the lens of self-motivation and attitudes; which is not readily apparent in most current research of similar topics (Center for American Progress, 2009; Kazakoff & Mitchell, 2017).

It is hoped that the findings discovered by this study can inform and influence district personnel, school administrators, and business organizations to design improved technological implementation plans that specifically address and support educator/employee motivations and tendencies toward limiting attitudes, uncover potential barriers to success, and dismantle resistance to ensure that more individuals feel supported thereby successfully adopting new technologies as they become readily available. Additionally, it is hoped that through this study, educators will be able to identify areas in which they feel resistant to change through quick analysis of motivational tendencies and possible areas of conflict within a limiting belief system. This will hopefully result in a better understanding of why they are experiencing these limiting

beliefs and make purposeful adjustments to be more aligned with being an innovator rather than a late adopter with regards to technology implementation.

Future implications of this study hope to afford educators and other professional learners with opportunities to better identify and manage personal motivation tendencies, issues relating to barriers and resistance to change, and address how attitudes impact overall outcomes. Furthermore, this study may be able to positively impact future exploration into issues relating to employee resistance to adopt new technologies within not only the educational setting but also the business industry. Since there is a connection between individuals identifying as either early or late adopters and being intrinsically or extrinsically motivated, it is evident that these issues are not strictly found within the educational setting alone but rather are apparent in other organizations where individuals work together in a collaborative, learning, technology-based working environment (Pink, 2011).

Summary

This research focuses on the current apprehensions and barriers that educators experience with technology integration in the classroom; the effect that these actual or perceived barriers have on impeding the process, and how motivations and attitudes are manifested as being either an early or late adopter during the integration of technology in their teaching repertoire. The theoretical foundation for the study involves the existing knowledge regarding the evolution of motivation; and how intrinsic and extrinsic motivation and limiting attitudes influence whether one is an early or late adopter. Additionally, research on how these motivators coupled with perceived or actual barriers affect the successful technology integration into the educational setting through the Framework for 21st Century Learning and the National Education Technology

Plan (Battelle for Kids, 2019a; National Education Association, 2017; Office of Educational Technology, 2017) contribute to the framework of this study.

Chapter Two: Theoretical Framework

"There are three things to remember about education. The first one is motivation. The second one is motivation. The third one is motivation."

Former U.S. Secretary of Education, Terrel Bell[5]

The theoretical framework for this study includes theories associated with intrinsic and extrinsic motivation, how attitudes affect innovation, and theories and models supporting the integration of technological innovation into the classroom setting. These areas of study will be examined through the lens of how resistance to change manifests itself in motivation, attitudes, and technology integration. As part of the theoretical framework, specific motivation theories of Self-Determination (Deci & Ryan, 2008) and Pink's Theory of Motivation (2011) as related to technology innovation will be presented. Research regarding the effects of resistance to change is also part of the theoretical framework.

The Origins of Theory of Motivation

While the conversations regarding motivation and drive originated long before the 1900's, only within the last century have specific theories on motivation emerged and become widely discussed and adopted (Pakdel, 2013; Ryan, 2012). Early 20th Century theorists such as: Maslow (1943, 1954), Herzberg, (1959), McClelland (1961), Skinner (1965), and Alderfer (1966, 1969) have been refining and adapting theories as their understanding of what drives personal and professional motivation evolve (American Psychological Association, 2002). Modern theorists such as Deci and Ryan (2008), and Pink (2011) have further refined theories relating to intrinsic and extrinsic motivation and their effect on an individual's ability to grow

[5] Found in: Hacker, Dunlosky & Graesser, (2009)

and succeed within society and their work industry. As society is shaped by the work of these theorists our understanding of what motivates individuals in their decision-making processes evolves; whether personally or in the workplace.

What is motivation? Generally speaking, motivation is defined as the energy or physical drive required to accomplish a task; rather, the act of being moved to do something (Brown, 2007; Ryan & Deci, 2000b). Motivation is the desire to accomplish a goal or activity based on two deciding factors; whether an individual is motivated to perform based on a set of preconceived intrinsic or extrinsic rewards. Within the educational realm, motivation takes on a more specific meaning as defined by Sinclair (2008). He purports that motivation is defined by three terms: attraction, retention, and concentration as relating to the teaching profession; how individuals are attracted to the field of education, the length of time it takes to complete their education and the level of retention within the teaching profession, and their level of engagement in their coursework and field of study. Furthermore, the Center on Education Policy states that a lack of motivation affects one's approach to education, relatedness to peers and colleagues, the amount of time and effort devoted to preparation, and the desire to seek support and camaraderie from others (Graduate School of Education and Human Development, 2012).

This part of the theoretical framework intends to first, outline and discuss the evolution of the theory of motivation, and second, discuss in further detail intrinsic and extrinsic motivation with regards to attitudes. While the researcher understands that there are many theorists whose work surrounds motivation, especially that of human motivation, for the purposes of this research, only the above-mentioned theorists and their theories will be discussed.

Early theorists. Maslow's (1943, 1954) Hierarchy of Needs then his refined Human Motivation Model were the catalyst for which early theorists based their motivational work because of the depth at which this instrument was able to describe human motivation and drive (Latham, 2012).

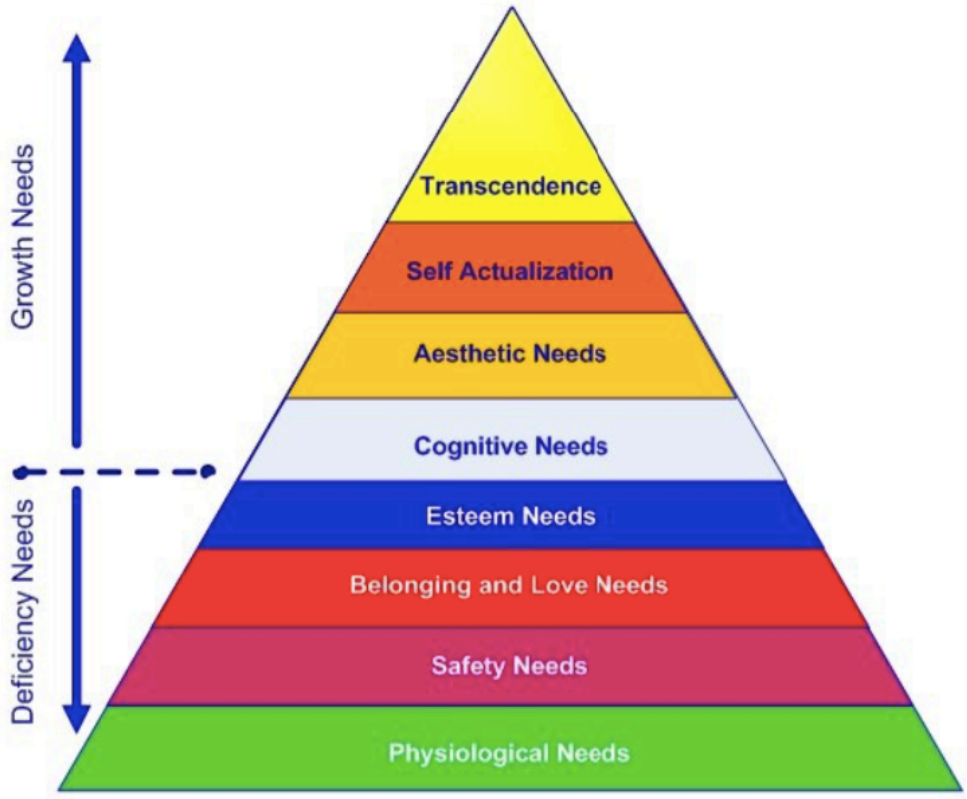


Figure 2. Maslow's Motivation Model by Mcleod, S. (2020) adapted from Maslow's Hierarchy of Needs by Maslow, A. H. (1954). Reprinted with permission.

As depicted in Figure 2 above, Maslow (1943, 1954) believed that humans are motivated by two specific categories of needs: deficiency needs and growth needs; and that certain needs take precedence over others because they necessitate the basic foundations of human life (Mcleod, 2017). He surmised that before anyone can grow and thrive, they must first satisfy their basic deficiency needs; that one precedes the other and movement from one level to the next is directly

dependent upon satisfying the needs of the lower level. The original five basic needs were: psychological, safety, love and belonging, self-esteem, and self-actualization. However, in 1954 Maslow updated this model to reflect the expansion of the top tier, the growth needs which, again, he believed could not be met until the deficiency needs were satisfied. As seen above, this update included the original need of self-actualization with the addition of three new needs: cognitive, aesthetic, and transcendence.

The Hygiene-Motivation or Two-Factory Theory by Herzberg (1959) focuses on an individual's inherent need to feel job satisfaction in the workplace. His theory concluded that there are two sets of motivational needs: the lower level animalistic needs, such as the avoidance of pain and deprivation; and the higher-level humanistic needs of psychological growth and maturation. The lower-level needs he coined *hygiene* while the higher-level needs, he called *motivators*; hence, the two-factor name (Chartered Management Institute, 2012; Herzberg, 1959). The idea of intrinsic and extrinsic motivators as a means to either motivate or dissuade employees originated from the technique of *job enrichment*; another term he coined. Herzberg (1959) purports that extrinsic or hygiene factors, such as: salary increase, working from home, increase in benefits, or a comfortable working environment ultimately do not increase employee satisfaction but primarily serve to prevent job dissatisfaction in that dissatisfaction in the workplace would arise in their absence. In time, these factors are not viewed as benefits or rewards but are regarded as workplace rights and expectations lessening their intended effects. On the flipside, motivators, commonly referred to as intrinsic or growth factors, relate specifically to the work being performed by the individual, such as: personal achievement, job recognition, added privileges or responsibilities, and advancement and growth within the

organization (Chartered Management Institute, 2012). Even though Herzberg's (2003) work primarily focused on employee satisfaction and dissatisfaction within the business industry, the factors for satisfaction can carry over into the educational realm. Educators are still, in fact, employees; and the culture of the work environment in the school setting shares similarities with typical office dynamics. It can be argued that since Herzberg's (1959) work mainly encompasses extrinsic motivation characteristics, with minor emphasis on intrinsic motivation; it is therefore limited in its capacity to fully address the current issues surrounding motivation in the educational workplace. Herzberg (1959) was the catalyst for Ryan and Deci's (2000b, 2017) current work on intrinsic and extrinsic motivation discussed in further detail in the *Modern Theorists* section.

McClelland's (1961) Need for Achievement Theory proposes that there are three basic needs in which people are motivated into action and that the stronger the need the stronger the behavior of the person in his/her attempts at satisfying that need. McClelland (1961) argues the needs of individuals are learned and shaped through coping with one's environment, therefore, desired behaviors recur at a higher rate when rewarded accordingly. Unlike Maslow (1954), McClelland (n.d.) contended that human motivation is only contingent on three dominant needs: achievement, power, and affiliation; no lesser needs were outlined. Furthermore, he argues that these needs are fluid, meaning that an individual will behave in such a manner to fulfill whichever need is more dominant at that moment. This implies that personal satisfaction and motivation are based strictly on the basic attempt to fulfill needs rather than thrive from them.

While both Maslow's (1954) and Skinner's (1965) work sustained the belief that individuals must develop through pre-defined stages, their theories differ in the method by which

individuals attempt to meet their needs. Maslow's (1954) work focused primarily on the positive aspects of meeting the needs of an individual and their ability to thrive as a result. However, Skinner's (1965) work embodied the idea that humans conditionally meet their needs pursuant on whether they receive positive or negative reinforcement; more closely related to the work of McClelland (n.d.). Skinner's (1965) theoretical work focused primarily on operant conditioning and behavior reinforcement as motivational drivers; that one's behavior is directly affected by received and/or anticipated rewards or consequences. Skinner's (1965) Reinforcement Theory stated that an individual's behavior is directly related to the type of reward he/she receives; that behavior follows three basic rules of consequence: reward for positive behavior reinforces positive behavior, punishment for negative behavior weakens negative behavior, and in the absence of reward or punishment the behavior receives no consequence ultimately leaving the individual with no apparent feedback nor clear direction.

Shortly after the publication of Skinner's (1965) Reinforcement Theory, Alderfer (1966, 1969) designed a new theory on human needs and motivation. According to Alderfer (1966, 1969), the Existence, Relatedness, and Growth (ERG) Theory was developed because he surmised that a more comprehensive explanation could be reached of the kinds of phenomena that Maslow's (1954) theory addressed. Through his research into Maslow's (1954) theory, Alderfer (1966, 1969) concluded that there was no distinct delineation between needs; where one stops another begins; arguing that the basis of Maslow's (1954) characteristic distinctions between needs leaves plenty of gray area for misinterpretation. As such, the ERG Theory was developed as an intended means to draw clearer lines between the characteristics of one need from another (Alderfer, 1969). Much like the Reinforcement Theory (Skinner, 1965), the ERG

Theory assumes that an individual has only three core needs. However, the difference being that the core needs are existence, relatedness, and growth; and that all three working in tandem make up the basic elements of motivation (Alderfer, 1969). Alderfer (1969) defined existence needs as those associated with material and physiological needs, such as: hunger, thirst, income, employee benefits, and physical working conditions. The main tenet is that when resources are limited, one individual's gain is another's loss (Alderfer, 1969). Relatedness needs include involving relationships with loved ones, significant others, and important people in the individual's life. Meeting this need is directly dependent on satisfying the needs of both parties since overall satisfaction comes from seeing loved ones succeed in life. Alderfer (1969) believes that the core characteristics of relatedness are acceptance, confirmation, understanding, and influence. Growth needs encompass all characteristics that help an individual to make a creative or productive impact, whether personally or societally. Alderfer (1969) purports that these needs are met when an individual is able to engage in problem solving, the utilization of his/her skills and knowledge, and provide a greater sense of wholeness and fullness as a human being. One of the most significant departures from Maslow's (1954) theory is that when an individual identifies a deficiency in a higher category, he/she can redouble his/her efforts to strengthen the lower categories in the hopes of achieving wholeness across all needs rather than remaining stuck in deficiency until that particular need is fulfilled (Alderfer, 1969).

Modern theorists. Herzberg's (1959) Hygiene-Motivation Theory, was the catalyst for modern day motivational theorists in that his research was the first to identify two types of motivation; intrinsic and extrinsic. Prior to Herzberg (1959) most research was conducted under the assumption that an individual's behavior was only directly motivated by the desire to fulfill a

need deficiency. Up to this point, little to no research had been conducted on the effects of outside influencers versus internal desires to perform tasks. When motivation theories were researched in the confines of a workplace environment, results suggested that individuals perform actions based on two types of motivation factors; one internal and the other external (Herzberg, 1959; Ryan & Deci, 2000b; Vansteenkiste, Niemiec, & Soenens, 2010). From this body of knowledge, the Self-Determination Theory (SDT) emerged. At its core, the Self-Determination Theory is a meta-theory rooted in an organismic perspective outlining the different types of motivation ranging from control to autonomous in the areas of psychological growth, integrity, and wellness (Ryan & Deci, 2017). Furthermore, Deci and Ryan (2008) purport that their Self-Determination Theory relates exclusively to the "interplay between both extrinsic forces that are acting upon people and the intrinsic motives and needs inherent in human nature" and that these powerful forces are continually at play seeking ways to motivate and shape us; while helping to maintain our balance (p. 10). Originally adapted from Deci and Ryan's (1985) book on self-determination, this theory has since grown and expanded into the meta-theory that is universally recognized today (Deci & Ryan, 1985).

In an interview by Katherine Bell (2010), Pink explains that humans, by virtue of being humans, come pre-packaged with a mix of drives, both biological and psychological in nature; and that these drives have always been present. However, he mentions a third driver that often gets neglected in business, the motivation to be intrinsically rewarded; the idea that humans have this innate motivation to engage in tasks because they are fun and interesting, because the reward is the enjoyment in the process with the potential for contribution to others (Bell, 2010). Pink (2011) explains that the shift in motivation in the workplace is not a result in a shift in people's

motivations but rather in the type of work people are performing (Bell, 2010). Pink (2011) addresses a concept that none of the other theorists before him have mentioned, the connection between the type of work people are doing in the 21st Century and the factors by which individuals are motivated to perform in the workplace (Bell, 2010). He notes that the previous methods of extrinsically motivating individuals to perform tasks are no longer suitable for the more knowledge-based creative work (less algorithmic-repetitive tasks) that people are engaged in during this century; and that they effectively demotivate individuals and increase the potential of causing workplace problems and resistance (Pink, 2011). Amabile and Kramer (2010) believe that since individuals are by nature a mix of motivators, both intrinsic and extrinsic, that their ultimate drivers are to seek skill mastery, engage with others, and improve themselves. Pink (2011) believes the key to increasing intrinsic motivation is to infuse the workplace with autonomy, purpose, and mastery; providing individuals with the opportunity to progress, hone their skills, and feel they are making an impact in their work (Bell, 2010; Pink, 2011).

Intrinsic and Extrinsic Motivation

Humans, by nature are inquisitive and playful creatures designed to explore and experience life around them; and in their healthiest states do not require external incentives or rewards to engage in life (Ryan & Deci, 2000a). This uninhibited experiential engagement and knowledge acquisition is critical to the healthy development of cognitive, social, and psychological growth. These life-shaping experiences offer individuals the opportunity to lead well-balanced, robust, and successful lives (LaGuardia & Ryan, 2002). Furthermore, these autonomous intrinsic behaviors are driven by curiosity, enjoyment, and the overall satisfaction

gained from learning. From their extensive research, Ryan and Deci (2000b) identified three types of intrinsic motivation:

1. Intrinsic motivation toward knowledge is observed if an activity is performed for the pleasure or satisfaction of learning or understanding something.
2. Intrinsic motivation toward accomplishment is defined as engaging in an activity for the pleasure toward accomplishing or creating something.
3. Intrinsic motivation toward stimulation occurs when an activity is performed to obtain stimulating experiences.

These examples of motivation are not performed by the individual for the sake of validation from others, higher compensation, employment advancement, or any external reasoning other than the internal desire to improve, connect, and for the enjoyment of the activity. Legault (2006) believes that intrinsic motivation is by nature non-instrumental, meaning that the individual's participation in the activity is not contingent upon any external outcome other than engagement in the behavior itself. Furthermore, intrinsically motivated individuals are continuously actively seeking out and processing new information and events while utilizing learning resources available to them in order to obtain new knowledge and skills in a self-directed way (Keller & Suzuki, 2004; Song & Bonk, 2016).

However, not all forms of motivation are internal, some are influenced by external factors not associated with personal development and enjoyment. This construct is known as extrinsic motivation and effectively alters the intention from internal to external reasoning; shifting the source of motivation, locus of control, and locus of causality for action (Legault, 2006). Participation in activities, behavior performance, and intentions behind extrinsic motivation are

driven by the desire to attain an outcome outside of engagement in the activity itself. In other words, extrinsic motivation is performed for the express purpose of seeking a reward as payment for participation in an activity or task. This type of motivation is thought to have a detrimental impact on experiential learning, psychological development, and the overall development of autonomous self-sustaining behaviors (Kohn, 1999). Characteristically, extrinsic motivators yield specific outcomes, such as rewards or avoidance of punishment, low autonomy, and lack of internal satisfaction.

As noted by Ryan and Deci (2000b), a behavioral regulation continuum (otherwise formally known as Self-Determination Continuum) exists that identifies the degree in which a behavior has been assimilated into an individual's identity and sense of self (see Figure 3 below). The continuum includes four types of regulation: external, introjected, identified, and integrated. *External regulation* is where behavior is controlled by external incentives such as praise, rewards, and punishment avoidance. *Introjected regulation* is when the external contingencies have been internalized and the individual acts to facilitate self-esteem (e.g. exhibit ability) or lessen guilt and avoid demonstration of failure. *Identified regulation*, happens when a shift begins to occur moving an individual from external to internal and engagement is viewed as a means to an end. *Integrated regulation*, which is the most autonomous kind of extrinsic motivation, appears when the behavior is fully integrated into personal values and beliefs with an avoidance of any hidden agenda.

As individuals progress along the continuum their motivations evolve from amotivation to extrinsic to intrinsic. This self-determination continuum represents an individual's departure from experiencing an absolute lack of control (amotivation) or choice to the ability to engage in

autonomous behavior for a prolonged period of time (Li, Lee, & Solomon, 2008; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Wilson, Rodgers, Blanchard, & Gessell, 2003). Further exploration into the concepts of intrinsic and extrinsic motivation will be analyzed through the lens of Ryan and Deci's (2000b) Self-Determination Theory and Pink's (2011) Theory of Motivation in the subsequent sections.

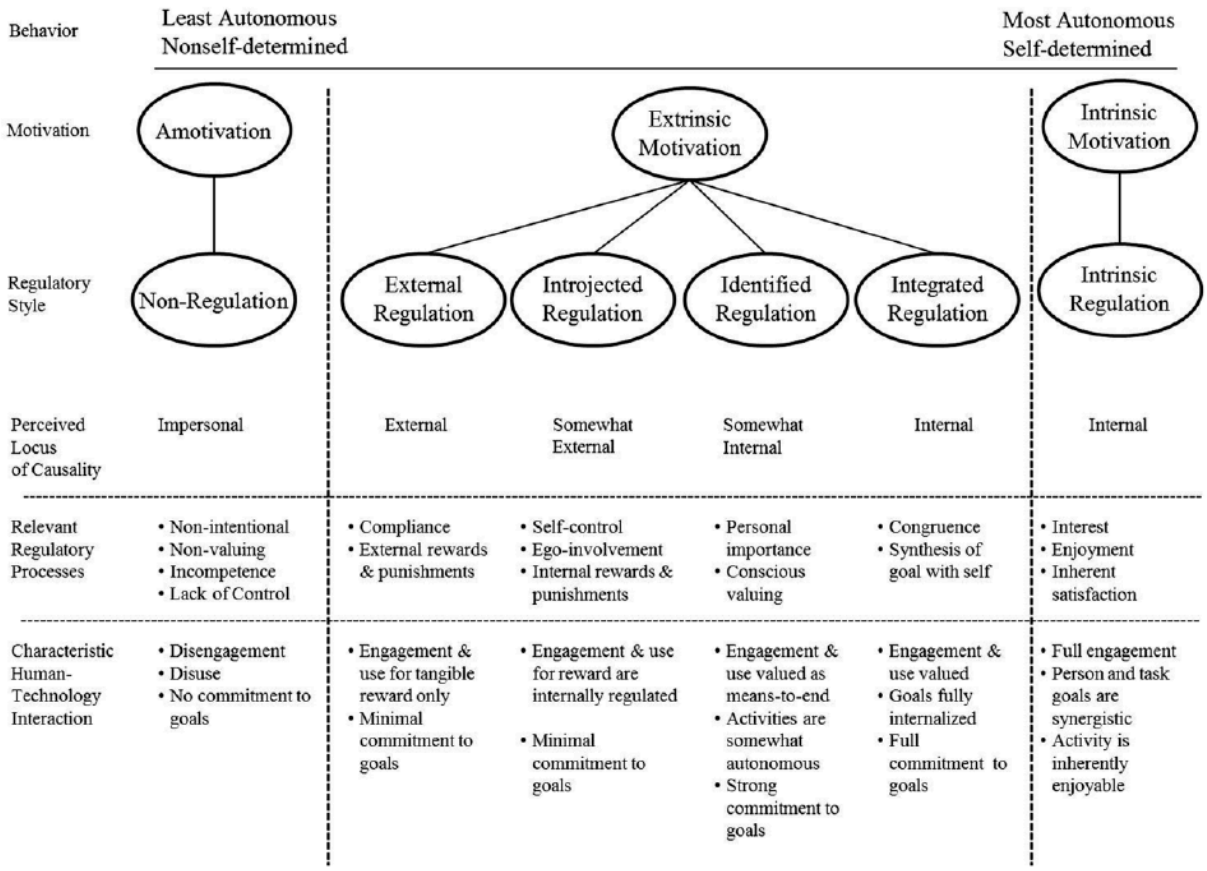


Figure 3. Self-Determination Continuum. *The Self-Determination Continuum Showing Types of Motivation With Their Regulatory Styles, Loci of Causality, Corresponding Processes, and Characteristic Human-Technology Integration,* by Szalma, J. L. (2014). As adapted from the Self-Determination Continuum by Ryan and Deci (2000b), Reprinted with permission.

Self-determination theory. According to Ryan and Deci (2000b), Self-Determination Theory also focuses on the social and cultural factors associated with either supporting or undermining an individual's well-being, performance, initiative, and choice. Three main conditions that impact an individual's experience, whether intrinsically or extrinsically, are autonomy, competence, and relatedness; which have the propensity to foster "the most volitional and high-quality forms of motivation and engagement for activities, [directly affecting] enhanced performance, persistence, and creativity" (Ryan and Deci, 2017, p. 11). On the flipside, Self-Determination Theory cautions that there is a detrimental impact on performance, social connectivity, and overall health and wellness within individuals when a balance is not properly established and maintained.

Within the Self-Determination Meta Theory there are six mini-theories; however, for the purpose of this study, only two mini-theories will be addressed: Cognitive Evaluation Theory (CET) and Organismic Integration Theory (OIT; Deci & Ryan, 2008). Cognitive Evaluation Theory discusses the concept that there is an intrinsic motivation within everyone that is based on the idea that people participate in activities or accomplish goals because of an internal desire to do so, for its own sake. On the other hand, extrinsic motivation, or Organismic Integration Theory, focuses on the idea that an individual's participation in an activity is directly related to an outward tangible reward or avoidance of a punishment.

Cognitive evaluation theory – Intrinsic motivation. The first Self-Determination Meta Theory's mini-theories, Cognitive Evaluation Theory, encompasses the idea that people have intrinsic motivational drivers that are based on the desire to participate in activities or attain goals because of an internal drive to do so, for the sake of personal satisfaction. Attaining goals,

participating in an activity, learning a new skill are all derived from the enjoyment that comes from active participation due to an internal desire and pursuit of enjoyment rather than an external tangible reward. Additionally, individuals who are intrinsically motivated are those who desire above all: knowledge acquisition, personal accomplishments, positive self-talk/affirmation, sincerity, and instinct. Some of the outcomes of these motivators are to reduce stress levels and improve overall sense of self, a promotion due to self-directed learning not salary increase, a possibility of helping others in need while simultaneously receiving personal satisfaction, and an increased level of creativity as a result.

According to Malone and Lepper (1987), there are both individual and interpersonal forms of intrinsic motivation. Individuals that are intrinsically motivated do so out of personal enjoyment, fulfillment, and ultimately a sense of altruism whose effects typically last longer due to a lack of outside attachments or influences[6]. Within the individual intrinsic motivator format there are four sub-categories: challenge, curiosity, control, and fantasy. Interpersonal motivators consist of three subcategories: cooperation, competition, and recognition.

Challenge, curiosity, control, and fantasy appeal to the individual part of the intrinsic learner in that there is no need to perform tasks with other individuals since this can be done completely individually. Success or failure lies solely in the individual's motivation to either succeed or fail at the desired task and is not dependent on any one or thing. *Challenge* is defined as the ability to increase motivation when pursuing challenging yet attainable goals that have meaning to the individual. *Curiosity* denotes an innate curiosity to the environment which is stimulating to the senses and mind. *Control* over one's environment and activity are important

[6] See: Organismic Integration Theory/Extrinsic Motivation Section

aspects of the individual's intrinsic motivation. And finally, *fantasy* not only appeals to the emotional needs of the individual but also allows the individual to be able to identify with the characters within the activity or experience.

The second form of intrinsic motivation is interpersonal. Individuals that experience interpersonal intrinsic motivation are those that value: cooperation, competition, and recognition. While its counterpart, individual intrinsic motivation values solely individual experiences and his/her motivation as a catalyst, individuals who prefer interactions with others while still maintaining an inherently intrinsic form of motivation are known as interpersonal intrinsic motivators. *Cooperation* is the desire to cooperate with others to complete an assignment or task. *Competition* is the satisfaction that is gained from helping others and comparing performance to one's own self. *Recognition* is the actions and performances that are recognized by others. Typically, this value would be considered an extrinsic motivator, however, when viewed through the lens of intrinsic motivation; the focus becomes more on using the recognition gained by others through the individual's actions and performances as an opportunity for self-reflection and overall betterment.

Organismic integration theory – Extrinsic motivation. Organismic Integration Theory is the second mini-theory outlined in the Self-Determination Meta Theory. Organismic Integration Theory deals with extrinsic motivators, i.e. external motivators that are tangible. An individual's participation in an activity or accomplishment of a goal is directly related to the tangible reward that he/she will receive once that activity is completed. Similarly, not all extrinsic motivators are positive in nature, like rewards, sometimes extrinsic motivators can be related to punishment or pain avoidance. These forms of motivators are not self-directed, but rather fueled by outside

influences which often result in engagement that is devoid of joy because the end goal is a fleeting yet momentarily rewarding or painful experience. Unlike its counterpart, extrinsic motivation is not long-lasting and does not provide permanent intrinsic rewards which has the propensity to eventually frustrate the individual and cause resentment, if not a lack of desire, to continue engaging in said activity. Motivators such as: monetary gains, rewards attached to goal or activity completion, unexpected rewards, social recognition, and praise from others are typical drivers of individuals who are more extrinsically centered in nature.

While there are strikingly powerful benefits to both intrinsic and extrinsic motivation with regards to individual actions, the opportunity to become unbalanced increases when that individual focuses more on one type of motivation over the other causing an over-justification effect. Moreover, attempts made to motivate oneself or others extrinsically when intrinsic motivation already exists creates an environment where over-justification can occur, potentially decreasing the overall intrinsic motivator for that activity, and diminishing the motivation factor in future scenarios. The same holds true when an employer or outside individual attempts to extrinsically motivate an employee or individual who is already intrinsically motivated in that it diminishes the internal motivators and ultimately leaves the individual feeling frustrated, misunderstood, and unvalidated.

In order to establish and maintain balance between the two, one must be able to identify the motivators needed to accomplish the goal or activity; especially when considering the type of environment surrounding said goal or activity. Research has looked at how controlling versus autonomy-supportive environments impact functioning and wellness, as well as performance and persistence (Deci & Ryan, 2000). Being able to strike a balance between both forms of

motivation affords the individual the opportunity to maximize overall motivational force and increase long-term success. Striking a balance between the two also affords individuals more opportunities for becoming highly-motivated self-directed problem solvers. Self-motivated individuals are happier and more successful because they do not require external influencers in order to complete a goal or participate in an activity.

However, when strategically used by employers, extrinsic motivators can facilitate rewards for internally motivated actions and have a positive and lasting effect on employees (Eisenberger & Rhoades, 2001; Henderlong & Lepper, 2002). Moreover, Boggiano, Harackiewicz, Bessette, and Main (1985) as cited in Myers (2010) maintain that employers need to create a balance between intrinsically and extrinsically meeting employee needs by understanding that "a person's [intrinsic] interest often survives when a reward is used neither to bribe nor to control but to signal a job well done, as in a 'most improved player' award" (p. 239). Eisenberg and Rhoades (2001) and Henderlong, and Lepper (2002) additionally purport that feelings of competence and creativity increase when rewards, such as scholarships and employment opportunities based on good grades, are rightly administered.

Pink's Theory of Motivation

Originating from the Self-Determination Theory, Pink's (2011) Theory of Motivation is an updated version of the positive effects of increasing intrinsic motivation and the potential detriments of ill-placed extrinsic motivation in the workplace. Similar to Self-Determination Theory, the Theory of Motivation encompasses three well-defined and essential characteristics of intrinsically motivating others.

Motivation Operating Systems. Pink (2011) has categorized the evolution of motivation from the beginning of man to present day society into three distinct Operating Systems: Motivation 1.0 (Biological), Motivation 2.0 (Extrinsic), and Motivation 3.0 (Intrinsic). Biological in nature, Motivation 1.0 is focused on fulfilling basic psychological and behavioral needs as well as self-serving desires. The largest motivation period, Motivation 2.0, moves beyond simple basic needs fulfillment and focuses more on external rewards and punishments as a means for control over IF/THEN scenarios or work expectations. At its core, Motivation 3.0 encompasses three main tenets that the bulk of the Theory of Motivation is comprised: autonomy, mastery, and purpose. Pink (2011) believes that these views are what drive individuals in the 21st Century, allow for improved work performance, and ultimately satisfy the innate need for self-improvement and connectivity within a societal construct. Below is a brief historical summarization of the three motivational periods as explained by Pink (2011).

Operating System: Motivation 1.0 – Biological. Motivation 1.0 dates back to the hunter/gatherer times, when man was motivated solely by satisfying biological and survival needs; food, procreation, security, and safety. This form of biological motivation worked well for the needs of people living in that time. The focus was mainly on survival and not much else. However, as society grew, people began integrating with one another and survival became more dependent on the complex social networks that were being formed, thus biological motivation ceased to be relevant. These biological motivators were no longer deemed appropriate in that they harmed the relationships that were being built within this complex society. An evolution of sorts was needed, which Pink (2011) coined Motivation 2.0.

Operating System: Motivation 2.0 – Extrinsic. As the human race evolved, so did the rationale for their motivations; enter extrinsic rewards and punishments, or the carrot and stick system.[7] Previous to the 21st Century most jobs were less algorithmic and more repetitive tasks which worked perfectly for the carrot/stick motivational system and yielded high performance outcomes on the part of the employees. This operating system has been so deeply embedded in society for centuries that although research has proven that it is no longer an effective form of inducing motivation in employees, most organizations have yet to shift. Pink (2011) believes that this bedrock assumption has been so tightly engrained in all organizations that they fail to release its archaic messaging, "the way to improve performance, increase productivity, and encourage excellence is to reward the good and punish the bad" (p. 17). According to Pink's (2011) rationale solely extrinsically motivating employees is archaic because current jobs require employees to do more knowledge-based creative work which is incompatible with carrot/stick systems. There are three areas of incompatibility that are noted as the reasons why Motivation 2.0 is no longer relevant in 21st Century work environments.

How we organize what we do. A shift has occurred in the way society organizes their efforts, drives intrinsic satisfaction of mastering challenges and problem solving, and satisfies the desire to communicate and collaborate with other like-minded individuals.

How we think about what we do. This concept is born from the idea that society does not always respond rationally to extrinsic rewards and incentives; regardless of intent or outcomes. Pink (2011) emphasizes the assumption that people are not single-minded robots responding

[7] A motivation system built on the premise that carrots are sweet/rewards and sticks are sharp/punishments; that people behave in a manner equivalent to an IF/THEN motivational reward/punishment behavioral system.

rationally to external rewards; but are rather complex human creatures who are naturally intrinsically motivated and therefore no longer fit the mold of Motivation 2.0.

How we do what we do. The carrot and stick reward/punishment system only functions in work environments that are IF/THEN driven. Twentieth Century factory jobs were IF/THEN (fixed rules and instructions) environments and worked perfectly for this motivational model. However, Pink (2011) points out that this type of model dulls thinking, destroys creativity, is counterproductive for heuristic tasks that require creativity and novelty, and hinders an employee's progress in the 21st Century work setting.

Operating System: Motivation 3.0 – Intrinsic. A shift occurred during the late 20th early 21st Century that moved away from the extrinsic form of motivation to a more internal driving force. A new concept that came into popularity centers on the idea that individuals are innately intrinsic creatures, designed to create and learn, and are driven to better themselves and the world around them (Pink, 2011). From this operating system, the three main intrinsic motivational tenets of: autonomy, mastery, and purpose were born as seen below in Figure 4. Pink (2011) explains that *autonomy* is the desire to make choices and direct one's own life; which ultimately produces significant improvements in work performance and overall employee attitude. Motivation 3.0 provides individuals with the ability to be autonomous over their time, chosen tasks, selection of team members, and technique in how to accomplish the tasks. *Mastery* is the desire to improve and can be achieved through deep engagement and purposeful study. Mastery is an attitude; beliefs shape achievements and achievements allow for growth and progress. *Purpose* is the desire to serve something larger than oneself and provides context for

autonomy and mastery. Individuals who are purpose-driven are generally more productive, motivated, and fulfilled individuals who work beyond self-interest (Pink, 2011).

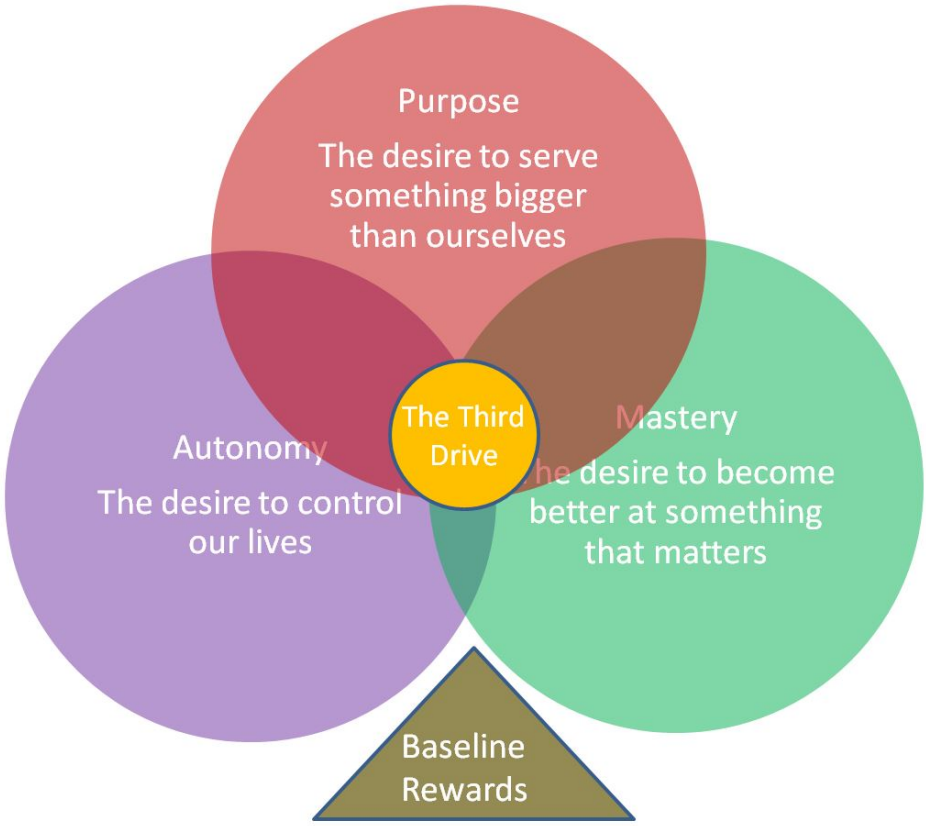


Figure 4. Motivation Model by Cole, N., Conversion Uplift (2020), as adapted from Pink's Theory of Motivation by Pink, D. H. (2011). Reprinted with permission.

According to Pink, (2011) when autonomy, mastery, and purpose are working in tandem, the Third Drive, as depicted in Figure 4 above, serves as the result of a more satisfactory more balanced experience that increases the propensity at which an individual or employee experiences intrinsic motivation and thereby personal fulfillment in his/her tasks and activities. This Third Drive is more than just the drive of motivation for intrinsic or extrinsic rewards, Pink (2011) purports "our innate need to direct our own lives, to learn and create new things, and to do better by ourselves and our world" (p. 219). Baseline Rewards represent a purposeful variety

of rewards, both intrinsic and extrinsic in form, that serve to properly motivate and drive individuals/employees in the betterment of themselves and others. These rewards are equitable and fair in make-up and must accurately reflect the individual/s for which designed.

Dweck's Mindset Model

The etymology of the term *mindset* has been around since approximately the mid 1900's to define a mental attitude, a state of mind, or to explain an individual's set of assumptions, opinions, or methods (Gollwitzer, 1990, 2012). Prior to 1970 mindset was only used to describe the correlation between tasks and cognitive processes which, according to Nenkov (2012), affect how people interpret encountered information. The cognitive psychology realm conceptualized mindsets as nothing more than the cognitive procedures needed for task orientation and completion (Gollwitzer & Bayer, 1999). They believed that the sum total of the construct of mindset was intensely solving a task which activated cognitive orientation and led to a set of procedures needed to reach a result that was the most conducive to the successful completion of said task (Gollwitzer, 2012; Gollwitzer & Bayer, 1999). Up to this point, this was as far as mindset had evolved; relegated to the fields of cognitive psychology and social science; and only recently, academia (French, 2016). However, within the last three decades the fields of psychology, social science, and academia have awakened to a revolutionary shift in how the construct of mindset is viewed with the introduction of Carol Dweck (2016a).

Dweck (2016a) introduced the idea that mindset is more than just cognitive processes and task completions. Rather, she purports that mindsets are a set of common beliefs held by people about human attributes and that serve a guide for the interpretation process of those beliefs (Dweck, 2016a). Dweck's (2016a) conceptualization and characterization of the two forms of

mindset; growth (nurture) and fixed (nature) are influential in identifying and understanding an individual's preconceived opinions and abilities (Dweck, 2016a; French, 2016). According to French (2016), mindsets are malleable, alterable based on how an individual perceives his/her identity as a human and preconceived package of abilities. This core belief is a mindset and crucial component of his/her own personality. From this understanding, research contends that mindsets are fluid, not fixed, unless chosen to be so by the owner.

In their simplest forms, growth and fixed mindsets are a set of ideas and opinions that people believe about their most basic qualities and abilities. Individuals can be located on the growth and fixed mindset continuum based on their opinions of where ability originates. Both growth and fixed mindsets are built upon the premise that individuals either can or cannot shape their innate abilities through learning and experiences; their attitudes and opinions about themselves either afford them the opportunity to stay fixed in a particular belief system or allow them the chance to evolve from them. It is possible for individuals to experience a fixed mindset in one area (or situation) but a growth mindset in another, since experiences shape the way individuals perceive themselves and their abilities (Molden, Plaks, & Dweck, 2006) In a recent interview Dweck (2019) said,

> In a fixed mindset [individuals] believe their basic abilities, their intelligence, their talents, are just fixed traits. They have a certain amount and that's that, and then their goal becomes to look smart all the time and never look dumb. In a growth mindset [individuals] understand that their talents and abilities can be developed through effort, good teaching, and persistence. They don't necessarily think everyone's the same or anyone can be Einstein, but they believe everyone can get smarter if they work at it. (para. 9)

Growth mindset. Growth mindset is the idea that intelligence can be developed, that the learner is open to having new experiences and learning from them; therefore, intelligence

changes. Having a growth mindset equates to the belief that basic abilities are malleable and can be altered, shaped, and developed through dedicated and purposeful work. As a result, perseverance and resilience are built, and a love of learning ensues. When faced with failure, a growth mindset individual believes that he/she can learn from failures, using them as a catalyst to acquire and develop new skills to grow and improve. Growth mindset as a construct affords individual with the ability to thrive from challenges and setbacks to foster a path to learning (Dweck, 2015). Furthermore, individuals experiencing a growth mindset are able to achieve more in their lifetime because they learn from constructive criticism, viewing it as a cause for additional opportunities for growth (Charette, 2016; Dweck, 2016b). Dweck (2015) also believes that in order for continued success in achieving and maintaining a growth mindset, individuals need to rely on more than sheer effort. An organic and evolving repertoire of strategies coupled with collaboration and support from peers helps catapult individuals from experiencing short term growth mindsets to long term ones.

Fixed mindset. A fixed mindset happens when an individual believes that his or her intelligence is fixed, the idea that whatever the individual was born with, that is what he/she will forever have; therefore, intelligence is static. At its core, Dweck (2012) argues whether consciously or unconsciously, people's beliefs have a strong effect on what they want and how they go about achieving it. When an individual believes that his/her actions are unchangeable, or fixed, then the resulting action is one of proving oneself correct rather than learning from mistakes and subsequently course-correcting. Speaking in terms of limiting beliefs and negative thoughts towards oneself are common among individuals experiencing a fixed mindset. Additionally, fixed mindset individuals attempt to avoid challenges, are less resilient than their

growth mindset counterparts, and often choose to solely engage in activities that they perceive will highlight their strengths (Nussbaum & Dweck, 2008; Robins & Pals, 2002). All time and effort are spent documenting talent and skills rather than developing from them since they feel threatened by the successes of others (Charette, 2016; Dweck, 2010). Similarly, with regards to reaction to failure, a fixed mindset individual believes that his/her abilities are mostly inherent, and failure can be construed as a lack of basic abilities which cannot be acquired nor altered.

What really delineates a fixed mindset from one of growth is the vernacular in which individuals use to explain their attitudes about their experiences. One of growth mindset's main tenets is the term *Power of Yet*. Speaking in terms of *yet* means that although an individual is not yet succeeding at a task, that his/her attitude about it and subsequent vernacular can greatly enhance the change he/she may experience thus increasing the likelihood for success at any given task or opportunity to strengthen his/her abilities (Dress, 2016; Dweck, 2016a). Dweck (2016a) also argues that how individuals perceive their experiences and the language they use to describe those experiences yield higher outcomes of success when using positive verbiage. While the following common phrases provide some examples of verbiage used by individuals experiencing growth and fixed mindsets, most have been adapted from the work of Dweck (2016a) (Dress, 2016; Kumar, 2018). Phrases such as the following are common among growth mindset individuals: *failure is an opportunity to grow, I can learn to do anything I want, challenges help me grow*, *my effort and attitude determine my abilities*, *feedback is helpful and constructive*, and *I like to try new things*. Conversely, phrases such as the following are typically expressed by those presenting as experiencing fixed mindsets: *failure is the limit of my abilities*, *I*

am either good at it or not, my abilities are unchanging, *I do not like challenges*, *I cannot do it*, *it is too hard*, *I give up when frustrated*, and *feedback and criticism are personal attacks*.

This study does not intend to separate the constructs of motivation and mindset. Rather, the researcher argues the necessity of weaving elements of personal mindset throughout the concept of motivation to support the notion that when faced with the opportunity to learn people choose to either display a willingness to change and adapt or not based on their preconceived opinions, experiences, and natural intrinsic and extrinsic motivational tendencies. Although mindset as a construct is not widely accepted in the research arena, it continues to be seen throughout the literature. The goal of the following section is to provide insight into the current criticisms of Dweck's (2016a) and her counterpart Yeager's, Mindset Model as well as discuss some of the misinterpretations, misunderstandings, and misapplications with its usage primarily across the educational services sector.

While Dweck's (2016a) mindset theory quickly gained popularity among educators and paved the way for much of the current research; it has not gone without its criticisms. In a 2017 interview, Bates warns, "millions of dollars have gone into funding mindset research. If it turns out this doesn't work, that's a massive lost opportunity" (Chivers, 2017, para. 5). Additionally, he questions the validity of Dweck's (2016a) work due to repeated failed attempts at replicating the findings from her initial study. Other researchers argued mindset research has consistently overpromised and underdelivered since many mindset theorists utilize statistical methods known to be biased (Denworth, 2019; Singal, 2017). However, a recent study conducted at Michigan State University and Case Western Reserve University, substantiated one portion of Dweck's and Yeager's revised research arguing that low-achieving academically high-risk students and

disadvantaged students benefit from the mindset interventions; despite little evidence indicating benefits for their academically higher-achieving counterparts (Schwartz, Cheng, Salehi, & Wieman, 2016; Sisk, Burgoyne, Sun, Butler, & Macnamara, 2018). They argued the focus on learning processes coupled with effort helps raise self-confidence which, in turn, supports academic growth. Similarly, some educational economists purport that although most studies yielded only an increase of 0.1 in grade point average from participation in the interventions, it could mean the difference between failing or passing exit exams, meeting eligibility requirements for advanced courses, or graduating from high school (Denworth, 2019). Dweck (2017) acknowledges an awareness to the holes in her prior study subsequently partnering with colleagues to establish two foundations spurring new research into rectifying study limitations and shifting mindset science into pedagogical practice.

Kaufman (2015), Singal (2017), and other critics argued that Dweck's (2016a) pop psychology mindset model does not qualify as a mindset theory but rather an intelligence-related belief system that has often been oversimplified and overhyped despite evidence in its defense. Kaufman (2015) further explained that growth mindset, while possibly causing some growth in standardized testing, does not yield the same growth in general intellectual functioning. However, Kaufman (2015) supports the relevance of Dweck's (2016a) work outside of the educational realm, acknowledging the usage of the term *personal growth mindset* rather than growth mindset.

> She talks about the importance of cultivating a growth mindset [which] sounds a lot more like personal growth mindset than beliefs about intelligence. I think part of the issue here is that in her early work, she focused on beliefs about intelligence, and only later started referring to the beliefs as a 'mindset.' But her measurement never really caught up with her concept (para. 18).

Dweck's (2016a) Mindset Model and Deci and Ryan's (2008) Theory of Motivation include portions of Ryff and Keyes' (1995) seminal work on the theoretical model of psychological well-being that encompasses six dimensions of wellness: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. All three theories are relevant in a variety of personal and professional settings since its applications reinforce one another and are focused on the continued growth and development of oneself.

Aside from facing years of criticisms, Dweck (2016a) has endured constant misinterpretations, misunderstandings, and misapplications of her theory. Some of the most common of these include unintentionally creating a false growth mindset, painting fixed mindset as a negative connotation, and the oversimplification of the theory with a sole focus on effort. A *false growth mindset* occurs when there is a disconnect between knowing about growth mindset and properly applying it; causing a misunderstanding in the idea's core message (Dweck, 2016a; Gross-Loh, 2016). When a theory is taken out of context or oversimplified for the ease of the user it becomes diluted to the point where cognitive dissonance and subsequently, misapplications occur; as was the case with Dweck's (2016a) Mindset Model. Dweck (2017) became aware of this common misunderstanding upon learning many well-intentioned educators were simply pinning motivational posters on the wall but failing to create an environment ripe in learning from mistakes and failures. She argues the importance of creating an environment, whether in the classroom, office, or home that supports belief change so behaviors will also evolve; since a genuine growth mindset occurs through regular practice and not just by stating hollow phrases. Often times the idea of a fixed mindset is portrayed negatively because some individuals equate a lack of understanding or failure to learn a concept as bad rather than

understanding that failure and mistakes are a vital part of the learning process. Supporting this harmful idea has the potential to lead to anxiety, fear, and a lack of effort on the part of the learner (Dweck, 2017; Gross-Loh, 2016).

The journey of building a growth mindset involves fluidity between fixed and growth mindsets, purposeful work on dispelling triggers and fears, and understanding that mistakes and failures do not equate to intelligence but rather are learning opportunities for growth and expansion. Papadopoulos (n.d.) agrees with Dweck (2017) that the problem lies with the interpretation and application of the theory due to equating growth mindset with effort. Papadopoulos (n.d.) argues:

> If we believe effort is all we need to succeed in learning, we'll keep plugging away with ineffective strategies and fail to reach our learning goals. If a particular method isn't working, we'll benefit more from acknowledging it and trying something different than from praising ourselves [or others] for working hard and sticking with it (para. 11).

By engaging in metacognitive strategies individuals develop the understanding that the process of hard work, trying new strategies, and seeking input from others brings about progress and learning; the fundamental tenets of the growth mindset theory. Dweck (2016a) and Papadopoulos (n.d.) contend that a sustained state of growth mindset cannot exist without both effort and strategy; to do so would be to effectively harm the individual by stifling growth.

Technology Integration in the Classroom

Society as a whole is completely saturated with technology-infused experiences. Deeply entwined in our daily lives, it enhances the way individuals now conduct their lives. Technology integration is promoted to teachers as a means to enhance instruction, support learning, and provide authentic learning experiences for students in 21st Century classrooms. Stosic (2015)

believes that effective application of technology in the educational setting has three domains of use: technology as a tutor, technology as a teaching tool, and technology as a learning tool; and that all three must be present in order to maintain its effectiveness in a learning environment. Moreover, when properly leveraged, technology strengthens the student/teacher relationship, improves learning and collaboration among teachers, narrows the equity and accessibility gap for students, and transforms learning experiences to better meet the needs of all learners. John King, U.S. Secretary of Education believes, "one of the most important aspects of technology in education is its ability to level the field of opportunity for students" regardless of ability, income, opportunity, and circumstance (Office of Educational Technology, 2017, p. 3). Wagner (2014) and the Change Leadership Group at Harvard University identify seven skills students need in order to be prepared for 21st Century life, work, and citizenship: (a) critical thinking and problem solving, (b) collaboration and leadership, (c) agility and adaptability, (d) initiative and entrepreneurialism, (e) accessing and analyzing information, and (f) curiosity and imagination. The seven skills are further categorized into four constructs: (a) learning to know, (b) learning to do, (c) learning to be, and (d) learning to live together. The instruction and application of the constructs are supported by the integration of technology in the classroom setting. These four constructs, along with the three R's (reading, writing, arithmetic) and the four C's (communication, collaboration, critical thinking, and creativity) are further supported in the Framework for 21st Century Learning (Battelle for Kids, 2019a; Scott, 2015).

The urgency of technology integration. "In the wake of the hyper-learning revolution, the technology called 'school' and the social institution commonly thought of as 'education' will be as obsolete and ultimately extinct as dinosaurs" (Perelman, 1992, p. 50). Lee and Winzenried

(2009) purport that sixteen years later, despite the upsurge in its everyday use globally, digital technology continues to remain underutilized in school systems since its emergence as a necessity in preparing 21st Century digital learners. Because of the nature of our globalized, technology-driven world, employers value individuals who can communicate in virtual and physical environments, effectively and productively work in diverse teams, and be progressive and innovative (Scott, 2015). Research indicates that omitting technology from education negatively impacts businesses because of the shortage of 21st Century skilled individuals qualified to work in current and future jobs (Office of Educational Technology, 2017). According to Glotzbach (2018) schools are preparing students for jobs yet to exist which require the use of technologies yet to be invented. As such, Chen and Reimer (2009) believe that less emphasis should be placed on integrating technology itself and more emphasis on how technology can be leveraged to better support teachers in delivering ideas and curriculum. Proper use of technology should enhance instructional processes otherwise it becomes ineffective, irrelevant, and demonstrates only the ability to use the medium for isolated tasks (Knight, 2012). With regards to the urgency at which technology needs to be fully integrated into the school systems, Lee and Winzenried (2009) rationalize:

> There is a paradox in educational technology that needs to be resolved urgently. Education is the source of technological advancement, providing the knowledge and the people so necessary for that purpose. At the same time, the basic processes for schooling remain largely unaffected by that advancement. Technology has irrevocably altered the means of operation of most social agencies, governments, hospitals, libraries, shops and factories, entertainment, and the media. Schools, however, operate now in much the same way as they have always done; with the teacher and the classroom as the setting for learning and with technology playing only a minimal role (p. vii).

The single most critical challenge facing education today, according to Prensky (2001) is our non-technology savvy instructors, "who speak an outdated language [that of a predigital age], are

struggling to teach a population that speaks an entirely new language" (p.2). In an attempt to address this urgency, President Trump committed to spending $200 million dollars annually on an educational technology initiative in the K-12 classrooms, unfortunately, teachers have yet to receive the proper training they need to support their students in this initiative (Romm, 2017). Classrooms devoid of technology create environments that are not conducive to 21st Century digital learners and society as a whole. Phillip Powell, associate dean of academic programs at Indiana University argues, "the paradigm shift is away from functional knowledge to the ability to be fluid in your skill set and in your knowledge. It's imperative that [schools] teach students how to teach themselves" (Moran, 2018, para. 8). In an effort to support this shift, Battelle for Kids partnered with several change agent organizations, including the National Education Association, to create the Framework for 21st Century Learning[8] to aid educators in adjusting how they instruct their students (Battelle for Kids, 2019a; National Education Association, 2017). At its core, the framework leverages technology to support the way society's 21st Century digital students learn.

Digital use divide. In its traditional sense, the term *digital divide* specifically refers to the gap between students who have access to technology and devices at school and at home and those who do not (Culp, Honey, & Mandinach, 2005). The divide typically refers to the societal gap that separates the underprivileged; especially the poor, elderly, handicapped, and uneducated individuals from the wealthy, middle-class, young, and educated. This divide often begins to manifest when children are young and are susceptible to the lack of technology in their lives; becoming deficiencies as they mature into adulthood creating, unless rectified, a cyclical

[8] See Figure 1

generational divide. The lack of proper technology in the school system perpetuates the problem. However, another divide exists and is gaining momentum in the educational realm. The term, *digital use divide* refers to the way in which students leverage technology to transform their learning (active) rather than simply engaging in task completion on an electronic device (passive; Fishman, Dede, & Means, in press; Valadez & Duran, 2007; Warschauer, 2012). The digital use divide is present in formal and informal learning situations and does not discriminate between income classes among schools and communities. In addition, students often find themselves engaged in more technology-based activities outside of the school setting while experiencing less in the classroom; a paradigm that makes school appear to have less real-world relevance and further perpetuates the digital use dilemma (Illinois Institute of Design, 2007).

> By 2008 there was a wide and growing divide between the extent of the digital technology and its use in the home and the classroom. Schools and education authorities had largely chosen to ignore the technological development of the young in their homes; particularly in the period [between] 1995 – 2008 and have rarely factored that development into any holistic or networked educational development. Schools and education authorities have invariably continued to work on the assumption that the only 'real' education occurs in the classroom. (Lee & Winzenried, 2009, p. 223-224)

Emphasis should not only be placed on providing technology for all learners but also on preparing teachers to effectively plan and teach with technology to engage all learners and deliver digitally relevant skills for the 21st Century. As a result, the National Education Technology Plan (NETP17) was created (and updated annually) to establish principles and guidelines to enable learning by technology in alignment with the Activities to Support the Effective Use of Technology (Title IV A) of Every Student Succeeds Act as authorized by Congress in 2015 (Office of Technology, 2017). The plan identifies every aspect of technology integration as it relates to teaching and learning and creates an infrastructure that delineates

responsibilities for each department of a school system. Some K-12 school districts have begun aligning their curriculum with the National Education Technology Plan, the International Society for Technology in Education standards, and the Battelle For Kid's Framework for 21st Century Learning, to better train and support their teachers in planning and delivering digitally relevant instruction in technology-rich environments (Roscorla, 2016). The belief is that, "when carefully designed and thoughtfully applied, technology can accelerate, amplify, and expand the impact of effective teaching practices...However to be transformative, educators must have the knowledge and skills to take full advantage of technology-rich learning environments" (Mezirow, 1997; Office of Educational Technology, 2017, p. 5).

Attitudes, Barriers, and Resistance

A national poll conducted by Harris Interactive noted that while 86% of teachers think education technology is important in the classroom only 14% actually engage in technology-based curriculum on a weekly basis (Bates, 2019). While a large percentage of teachers believe technology is important to the student's overall success, reports indicate that the implementation rates are moving at a much slower pace. According to a 2005 report by the U.S. Census Bureau, there are over 14 million computers in American public schools, however, teachers have yet to make the critical shift of integrating them into their teaching and the frequency at which technology is regularly used remains low (Bauer & Kenton, 2005; Bender & Waller, 2012; Roblyer & Knezek, 2003). Barriers, whether perceived or actual, inhibit teachers from fully participating in the technology integration process.

Intrinsic barriers account for some of the apprehension and resistance experienced by teachers. Some teachers are skeptical about the benefits that technology has in the classroom

setting and are unsure how to best integrate it into their pedagogical practices. New teachers are entering the profession lacking the necessary skills to successfully leverage technology as an instructional tool (Trilling & Fadel, 2009). Emerging technologies are evolving at a rapid pace; while teachers are finding it difficult to keep up with the learning curve and are left feeling unsure as to the best methods for integration (Hartley, 2014; McCaffrey & Minkel, 2002). Because of this apprehension teachers are not taking full advantage of the potential that technology offers. Moreover, they lack the understanding of how to integrate technology into instruction which leads to a "misunderstanding between integrating technology to enhance student learning and demonstrating the use of acquired computer skills" (Hartley, 2014, p. 4). Innovation requires cross-subject and cross-field research acquiring more than just a surface-level understanding; progressive attitudes and mindsets and resiliency support skills acquisition when learning becomes challenging (O'Keefe, Dweck, & Walton, 2018).

Extrinsic barriers such as outdated or insufficient hardware and software, lack of time and proper training, and shortage of support from key personnel diminish the rate at which teachers integrate technology (Rice, Wilson, & Bagley, 2001). Budgetary constraints limit the purchase of infrastructure, hardware, and software which further creates barriers affecting the integration (Berrett, 2012). A lack of vision by change agents and site leaders results when integration has not been made an integral part of the site technology plan. Teachers experience distrust in key personnel or change agents when, for one reason or another, violation of trust has occurred (Ford, Ford, & D'Amelio, 2008). Furthermore, inadequate planning and training time and an inflexible schedule do not foster a community of innovative-minded individuals.

An empirical study conducted in 2007 by Hew and Brush discovered there are more than 123 potential barriers which are classified into six main categories: *resources* (40%), *knowledge and skills* (23%), *institution* (14%), *attitudes and beliefs* (13%), *assessment* (5%), and *subject culture* (2%) (see Figure 5 below). Without the suitable resources, such as hardware, software, and infrastructure there is little opportunity for teachers to properly immerse themselves into knowledge and skill acquisition. Technology integration is more than simply acquiring computer skills, it is understanding how to leverage technology to enhance student learning (Knight, 2012). Institutional barriers consist of barriers with leadership, inflexible time and schedule constraints, and lack of proper site technology planning.

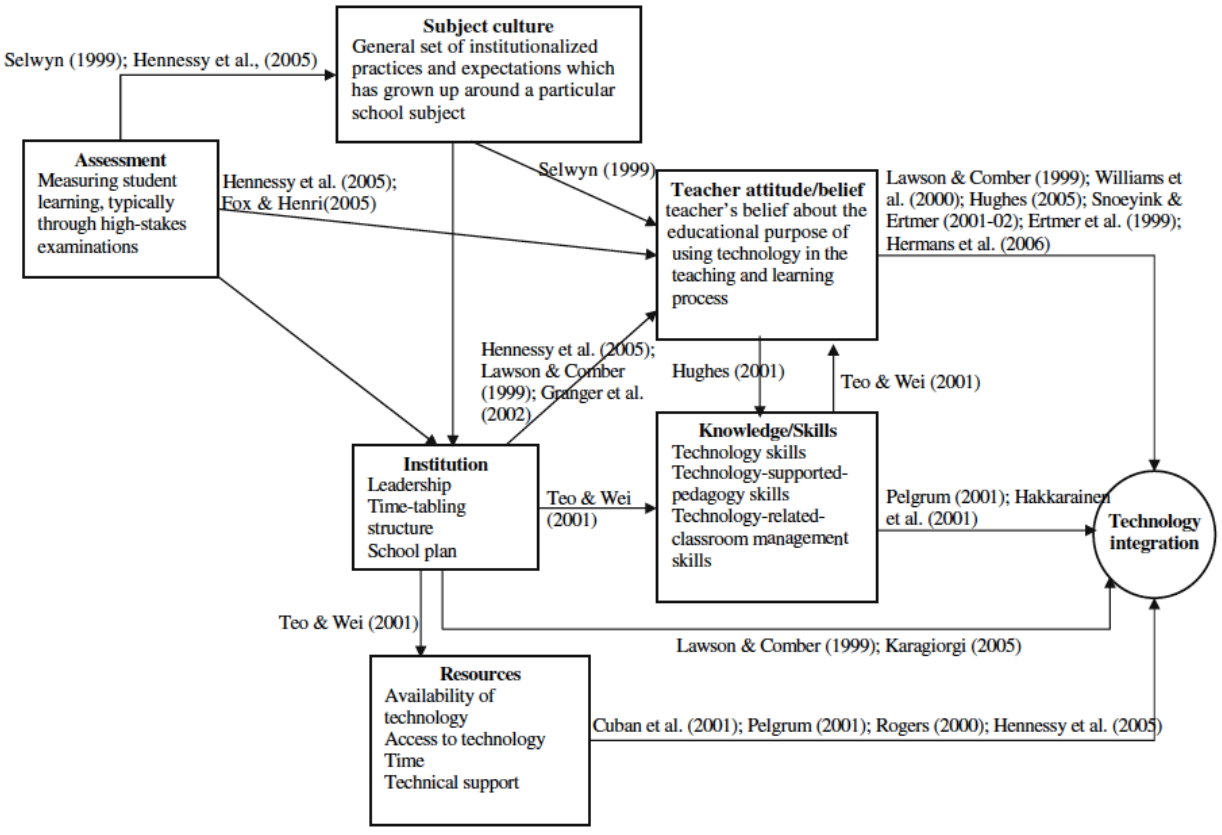


Figure 5. Model Showing Relationships Among Six Categories of Barriers, extracted from Hew & Brush, (2007, p. 231). Reprinted with permission.

While attitudes and beliefs resulted in only 13% of the total 123 potential barriers, previous research indicates that when teachers perceive adapting to innovation is too challenging the type of technology available for integration becomes irrelevant. Pressures relating to mandated testing and reluctance to adopting technology that seems incompatible to the norm of a subject culture tend to slow the pace of integration (Hennessy, Ruthven, & Brindley, 2005). Although the specific barrier subtypes are contained within their respective categories, direct connections can be made linking them together. Figure 5 depicts the relationship among all six categories of barriers and the belief that technology integration is directly influenced by four main barriers: attitudes and beliefs, knowledge and skills, institution, and resources (Hew & Brush, 2007).

Summary

The theoretical foundation for the study and the literature regarding the evolution of motivation; and how intrinsic and extrinsic motivation, mindset, and attitudes influences whether one is an early or late adopter provides a firm framework for the research. Additionally, research on how these motivators coupled with perceived or actual barriers affect the successful technology integration into the educational setting through the Framework for 21st Century Learning and the National Education Technology Plan (Battelle for Kids, 2019a; National Education Association, 2017; Office of Educational Technology, 2017) supports the relevance and significance for studying educators as they attempt to adopt technologies into their pedagogical practices.

Chapter Three: Methods

The purpose of this research is to explore individual teacher adoption patterns; specifically, their motivations and attitudes, and how perceived or actual barriers affect their ability to integrate technology. This study sought to produce detailed findings of both early and late adopters' intrinsic and extrinsic motivations for adopting technology and describe their willingness, inclinations, and practices of technology integration within the classroom. Additionally, the outcomes of this study can provide districts, administration, and businesses with insights into the motivations, attitudes, and propensities of their employees regarding technology adoption.

The overall central guiding question is: How does intrinsic and extrinsic motivation influence a teacher's decision to integrate technology in the classroom? This research question will be addressed through exploration of two sub-questions:

1. How do individual attitudes impact technology usage in the classroom?
2. How does resistance to change and perceived or actual barriers affect an individual's ability to integrate technology?

Research Design

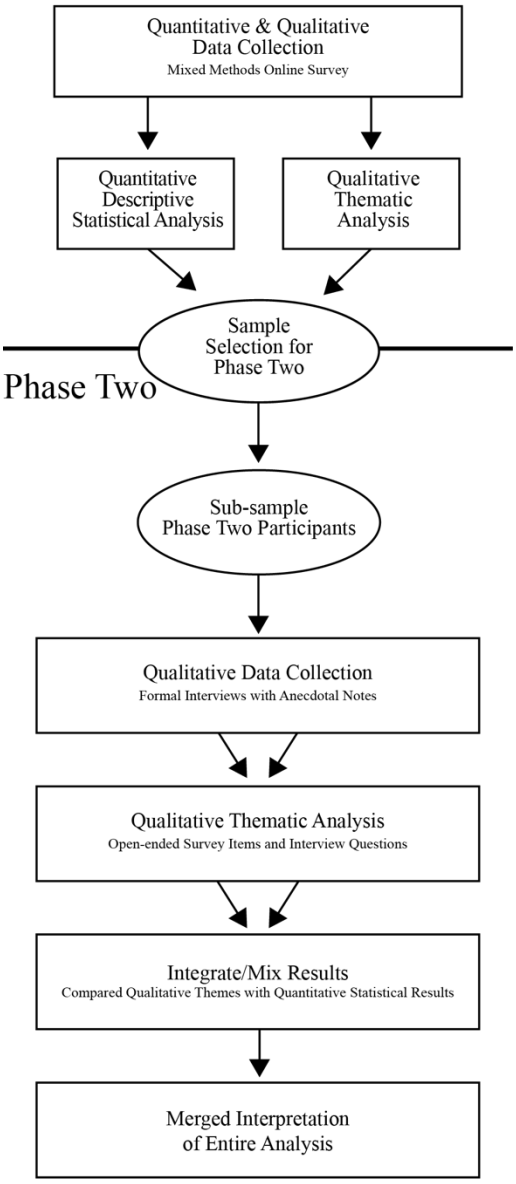
This research employed a sequential explanatory mixed methods design involving two phases. Phase One included a survey containing both quantitative and qualitative formatted items. Phase Two was comprised of a formal one-on-one interview and anecdotal notes recorded by the researcher. The rationale for conducting a mixed methods approach stems from the widely accepted view that it provides more robust data analysis since the researcher can take advantage of the strengths of both quantitative and qualitative methods within one study (Creswell, 2013;

Ivankova, Creswell, & Stick, 2006). Furthermore, mixed methods research is an intuitive way of conducting research that is relevant to and readily apparent in multiple ways throughout our everyday lives; in this case, measuring motivations, attitudes, and the perceived or actual barriers behind the resistance to adopt technological innovation (Creswell & Plano-Clark, 2018; Greene, 2007; Palinkas et al., 2015).

The rationale for using a two-phase sequential explanatory mixed methods approach is that the data collected during Phase One provided the researcher with a general overview of the participants' views and opinions and enabled the selection of individuals to be invited for participation in the interview (Cameron, 2009). This data was further refined with in-depth exploration of the willing participants' views coupled with researcher's anecdotal observations recorded in the researcher's journal collected during Phase Two the interviews (Driscoll, Appiah-Yeboah, Salib, & Rupert, 2007). The combination of this multi-phase sequential exploration provided the researcher with a better, more cohesive understanding of the problem experienced by the participants (Ivankova et al., 2006; Tashakkori & Teddlie, 1998). The Phase One survey included an invitation to participate in the Phase Two interview with a section to complete allowing them to become un-anonymous to the researcher. Follow-up invitations to coordinate interviews were sent via email to individuals who expressed interest. A flowchart depicting both phases of the study as well as outlining the procedures and products of each phase of the study is listed below in Table 1.

Table 1

Visual Display of Multi-Phase Explanatory Sequential Mixed Methods Study

Phase	Procedure	Product
Phase One 	Posts on various social media sites requesting K-8 public school teachers willing to participate in online survey Mixed methods online survey Interested participants were invited to complete second survey providing contact information and acknowledgement of becoming un-anonymous Formal Interviews Researcher's Journal • Coding and thematic analysis • Theme development cross-thematic analysis • Descriptive and inferential statistical analysis Interpretation and explanation of the quantitative and qualitative results from Phase One and Phase Two	Teachers participated in Phase One survey ($N = 172$) Numeric and thematic data Participant contact information; sample group compiled; ($N = 8$) Interview Protocol Anecdotal Notes • Codes and themes identified and categorized • Cross-thematic matrix and codebook • Numeric and thematic data Discussion Implications Limitations Conclusions Recommendations

Role of Researcher

The researcher is a veteran certificated classroom educator, teaching for the past two decades in a TK-12 inner city public elementary school setting. The bulk of research for this study was conducted in public elementary schools nationwide. The researcher has taught only Regular Education[9], as opposed to specialized programs, for the entirety of the certificated employment time. Typically, a significant portion of the students assigned to the researcher's classroom are classified as English Language Learners; while the remaining portion are native English speakers. The researcher is bilingual in Spanish and has been for the past 40 years. The researcher is currently an active member of three educational technology district committees, including the Educational Technology Steering Committee comprised of mostly high-ranking district and administrative personnel. Additionally, the researcher acts as onsite technology support personnel, serves as a Digital Citizenship committee member, and also functioned as a district Microsoft Surface trainer during the Microsoft Surface deployment and training periods.

The researcher is familiar with adoption practices, teacher attitudes and motivations, and technology implementation procedures. As such, specific measures were designed and employed to protect the identities of Phase One participants. Potential Phase Two candidates were directed to a link leading them to a secondary survey requesting them to become known to the researcher; a requirement in order to assemble the sub-sample group.

When expressing the importance of considering reflexivity in research, Kleinsasser (2000) believes that reflexivity affords the researcher the opportunity to methodically learn more about self as a researcher since it "illuminates deeper, richer meanings about personal,

[9] Also referred to as General Education

theoretical, ethical, and epistemological aspects of the research question" (p. 155). Reflexivity is essential to take into consideration when analyzing and interpreting the results of data gathering processes phases during both phases. Therefore, to minimize the potential for researcher biases, various bias-reducing methods were employed during data collection and analysis. As such, the researcher made a conscientious effort to systematically reflect in a journal on the behaviors and thoughts that arose during the study because of the personal values, workplace attitudes, beliefs of the problem at hand, and the knowledge of the industry in which the participants presently work to build trustworthiness and efficacy throughout the study (Lincoln & Guba, 1994; Phillippi & Lauderdale, 2018). Specifically, as outlined by Lincoln and Guba (1994) the researcher wrote daily in the research journal during both pre- and post-data collection periods. These notes were also comprised of a schedule describing the logistics of the study, a log of methodological decisions and changes, and personal reflections with particular reference to one's values, interests, and perceptions.

Sources of Data

Public elementary schools across the nation were the primary source of data for this research. Participants from this sample population provided data for both phases of the data collection process ($N = 172$). Their motivations, attitudes, and viewpoints with regards to adopting technological innovation within their pedagogical practices and their perceived or actual barriers to change were captured. The research journal kept by the researcher served as another source of data and was comprised of thoughts, perceptions, insights, emerging questions, and concerns as noted by the researcher.

Target Population

The target population invited to participate in this research were K-8 grade teachers at public elementary schools across the nation. Individuals who participated consisted of both veteran and novice educators instructing in Regular Education, Special Education (SPED), Kindergarten (K), Gifted and Talented Education (GATE), and Dual Immersion[10] (DLI) programs. By targeting this particular population, the researcher gained valuable insight into the participants' readiness to adopt technological innovation into their teaching repertoire and identified potential barriers to success and mindset blocks that may have an adverse effect on their overall willingness to adopt technological change. This understanding has the potential to have a positive effect on the overall culture of the school in that the researcher can implement strategies and support systems as needed to help foster a culture of growth, openness, and willingness to learn. As the current school site champion over technology and as a member of three district committees, the researcher has influence in the educational technology realm that can positively impact technology innovation at the school site and district level. Additionally, as a leader of a woman-owned business, the researcher's influence and reach transcends the educational services sector into the business realm.

Multi-Phase Data Collection

Since the study is an explanatory sequential mixed methods design, data collection strategies, tools and instrumentation, and procedures are discussed respectively within each of the two phases. Phase One encompassed a larger body of participants ($N = 172$) while Phase

[10] Dual Immersion Programs = Programs that focus on biliteracy and bilingualism; teaching academic content via multiple languages. The percentages taught daily within one language vary depending on grade level and state/program specific regulations/requirements.

Two consisted of a subset of Phase One participants ($N = 8$). Phase One consisted of an online survey designed to capture both quantitative and qualitative data while Phase Two involved mainly of qualitative data collected from formal interviews and anecdotal notes with qualitative data limited to only capturing profession-related demographics. Combining both qualitative and quantitative approaches within a multi-phase study provided the researcher with new knowledge and insights that is greater than the sum of its original parts resulting in a more cohesive and comprehensive understanding of the problem experienced by the participants (Creswell, 2013; Fetters & Freshwater, 2015).

The researcher received permission from various educator-affiliated social media platforms across Facebook and LinkedIn to source the sample population for this research. The researcher posted a brief introduction, explanation of the research, and request for individuals expressing interest in participating in the Phase One online survey; with an explanation of the potential to be interviewed during Phase Two. Those expressing interest were able to directly click on the survey link in the post to begin the survey.

Phase One Data Collection Tools and Procedures

An online survey (see Appendix A) was administered using the Qualtrics survey administration tool. The survey tool was designed to capture both quantitative and qualitative responses. Quantitative data consisted of nine 5-Point Likert Scale items, one Frequency Scale item, one Value Scale item, and six profession-related demographic items. Four open-ended items were used to capture more in-depth authentic qualitative responses. Both the quantitative and qualitative items focused on measuring educators' motivations, attitudes, and their level of

readiness to adopt new technology based on their current and previous technology integration experiences and practices.

An online survey is considered the best approach for data collection in that it allows for participants to take the survey at their convenience, in the location of their choosing during a specified amount of time (Andres, 2012; Lavrakas, 2008). The propensity for gaining more genuine responses to the questions has the propensity to increase due to the affordance of time, locale for the participants, and lack of stress that may ensue from the expectation of responding during a staff meeting. Gray (2009) believes that the use of online surveys allows the opportunity for more authentic responses to personal or delicate questions through the anonymous nature of this form of data collection. Additionally, online surveys reduce the potential for privacy issues that may arise with regards to personal opinions, perceptions, attitudes, and concerns. Since using an online survey administration tool has the potential to provide the user with a level of anonymity, the number of participants may increase due to the ease of clicking on a link and typing responses rather than writing out responses by hand; which can take longer to complete, are less anonymous, and result in a lower completion and submission rate (Gray, 2009). The participant was completed once the online survey was completed; all information was compiled online for the ease of the participants and researcher (Andres, 2012).

Once the survey was drafted, an individual with expertise in the content area was asked to review the survey items to ensure valid content. Changes and modifications were incorporated based on feedback in order to establish content validity for the survey. To ensure reliability a small pilot study was conducted within the survey administration tool.

Procedures

During Phase One informed consent (see Appendix B) with an option to either agree to voluntarily participate in or exit the survey was embedded directly in the online survey. Participants were afforded sufficient time to complete the survey and were given a pause and save button providing them with the ability to return to the survey if time or scheduling conflicts arose. The length of time allotted for the completion of the survey was two weeks. A thank you response was included, whether they choose to fully complete the survey. Additionally, an invitation for consideration to participate in the Phase Two portion of the study was included at the end of the survey with a link directing interested parties to an outside survey requesting them to become un-anonymous by providing their name, email address, and phone number for arrangements for interviews (see Appendix C).

Phase Two Data Collection Tools and Procedures

At the completion of the two-week period for Phase One data collection, those participants who expressed interest in participating in Phase Two by completing the interest survey at the end of the Phase One survey were sent an invitation via email to schedule the interview. For a richer data set, all respondents expressing interest were invited to participate in the one-on-one virtual interviews ($N = 8$).

Interview Protocol

Formal semi-structured virtual one-on-one interviews were conducted with those agreeing to participate (see Appendix D). Jacob and Furgerson (2012) believe that skilled interviewers can gain insightful information about their interviewees, uncover their perspectives and thoughts regarding the interview questions, and deepen the level at which data is collected

from the respondent allowing for a more in-depth understanding of the study problem. Furthermore, it is believed that Interview Protocols are more than a set of questions but serve as a guideline for researchers to follow throughout the study (Creswell, 2009; Jacob & Furgerson, 2012). Content of the interview included questions about intrinsic and extrinsic motivation, more in-depth questions regarding perceived or actual barriers that limit the adoption of technological innovation into their teaching repertoire, as well as a deeper discussion on their previously identified support network. The interview was designed to last no more than an hour.

The original format of the Interview Protocol, as outlined by Creswell (2009) was adapted to the following format (see Appendix D):

- A heading (date and location of interview, participant, and researcher names).
- Specific instructions for the participant and researcher; including acknowledgement that the interview would be recorded for transcription purposes only.
- Three icebreaker questions followed by fourteen questions regarding the central guiding question and two sub-questions.
- Neutral/non-directive responses to be used when needing to remain neutral.
- Five probing questions to steer the interviewee back to answering the above-mentioned questions in further detail.
- Time between the questions to allow for interviewees to ponder the subsequent question while the researcher takes notes as needed.
- Time allotted to respond to any additional questions or comments the interviewee has regarding the study or participation thereof.

- A final thank-you statement acknowledging the time spent participating in both phases of the study.

Once the interview was drafted, the questions identified within the protocol were shared with a content expert peer reviewer. Changes and modifications based on that feedback were incorporated into the Interview Protocol. To ensure the reliability, a pilot interview was conducted once the interview was completed followed by transcription using the TEMI transcription software.

In the event that the Interview Protocol needed to be revised or shortened, the researcher had a modified version on hand to mitigate any potential issues that arose throughout the interviews. Since the researcher is new at conducting formal interviews in this setting, a pilot interview was conducted with a third-party adult colleague for the purpose of undergoing practice and refinement of the Interview Protocol process. At this point, any calibrations or adjustments to the protocol needed were conducted prior to officially executing the Phase Two formal interviews.

Ethical Considerations

According to Creswell (2009), as with all research conducted at this level, it is crucial for the researcher to anticipate any potential ethical issues that may arise during the study. During this process, the researcher took extensive precautions to protect the identity and personal information of the participants, gaining their trust by avoiding misconduct that could negatively reflect on them or the institution at which the researcher is affiliated, thus ensuring that no issues arose throughout the course of the study (Israel & Hay, 2006). Given that the research posed minimal risk and targeted only public elementary school educators teaching in the K-8 grade

levels, all of whom were willing participants 18 years of age and older, the study met the criteria for Exempt research status as outlined by Pepperdine University's Institutional Review Board (IRB) approval (see Appendix E). The review board ensures that no human subjects are harmed or mistreated in the course of the study and maintains efficacy of the research. Informed consent was acquired by all willing participants during both phases of the study to ensure that no violations to personal information or identity occurred. Furthermore, there were no penalties or consequences to any individual who choose at any point to opt out of either the Phase One survey or Phase Two interview.

The survey questions and formal interviews did not pose any threat to the participants and focused only on their thoughts and perceptions regarding motivations, attitudes, resistance to change, and perceived or actual barriers to success with implementing technological innovation. Anonymity of response afforded participants privacy without concern for undue retaliation, questioning, or embarrassment in their responses from anyone; especially the key personnel with whom the final data results will be shared.

Multi-phase invitations and informed consents included:

- A summary overview of the purpose of the study outlying the intent to research educator motivations and attitudes with regards to resistance to adopt technological innovations and the perceived or actual barriers associated.
- Participation throughout both phases were voluntary; confidential during Phase One only. Prior to the onset of Phase Two, participants completed a secondary informed consent that un-anonymously identified respondents for participation in the formal

interviews; again, respondent information is only known to and kept private by the researcher and no one else.

- The length of time needed to complete the Phase One survey; 15 to 30 minutes.
- The length of time the Phase One survey was open for completion; two weeks.
- If chosen for Phase Two, a selection of dates and times to conduct formal interviews.
- The length of time needed to complete Phase Two formal interviews; one hour.
- The results of the survey and themes found across data, will be shared with key personnel only for the purposes of driving future growth opportunities.
- A reminder than no personal information will be shared with anyone; the identities and personal information of the participants will only be known to the researcher.
- All data, results, information, notes, and journals will be kept securely and for a minimum of five years.
- Researcher contact information was provided to all participants to address any questions or concerns.

All information provided by the participants was password protected, stored on an external hard drive, and kept secured by the researcher. Identities and personal information were protected; and Phase Two participants were assigned a pseudonym by the researcher. Additionally, no information was released to anyone. All logs, records, notes, participant codes, identifiable information, and the research journal were stored separately from the collected data providing another layer of protection for the participants mitigating any chances of a confidentiality breach. Only aggregate findings will be shared with key personnel for the purpose of driving future opportunities for professional growth and development.

Data Analyses

Quantitative data collected from the Phase One survey was downloaded from the online survey administration tool (Qualtrics) into a spreadsheet format. Descriptive analyses were conducted to summarize and interpret the responses. Qualitative data collected from the open-ended short answer questions was downloaded into the qualitative analysis software program (HyperRESEARCH) for thematic analysis. Interview data was transcribed (TEMI) and underwent a similar thematic analysis procedure. Data was coded using an a-priori coding scheme based on the conceptual areas of intrinsic and extrinsic motivation, barriers associated with resistance to change, and technology adoption integrations. Richards and Morse's (2013) model for qualitative thematic analysis guided the process. Emergent themes found throughout the coding process were also noted. In addition, the observational notes recorded from the interviews and the researcher's journal contributed to the findings. Study conclusions were determined following triangulation of findings.

Study Validity and Reliability of Instrumentation

As with all forms of research inquiry, it is essential that the researcher employ various strategies to minimize the potential of internal validity threats throughout the entirety of the study. Triangulation with a mixed methods approach afforded the researcher with the ability to collect a variety of data samples that deepened the findings of the study and reduced the uncertainty in interpreting the data (Gray, 2009). The potential for the misalignment of data results in this instance was avoided by ensuring that the initial quantitative and qualitative data process drove the secondary qualitative data process and that the participants' responses remained consistent throughout both phases of the study. The researcher used reflexivity during

the research gathering process to ensure that all data and findings were accurate, minimizing the effects of bias. The researcher fully reviewed and accurately coded the data, text files, and notes multiple times throughout the study to ensure consistency and accuracy; thereby maintaining efficacy. Research software was employed during both phases to ensure accuracy and consistency of the data collected. The researcher employed a peer reviewer during the qualitative analysis process to mitigate researcher bias and ensure consistency in coding and analyzing the data. Finally, the use of valid instrumentation, Interview Protocols, and the researcher's journal were kept by the researcher to maintain reliability. Andres (2012) believes that in order for instrumentation to be reliable it must be designed in "a clear and unambiguous way to ensure that the respondent would answer the item in the same way if he/she were asked the repeat the exercise" (p. 123).

Chapter Four: Findings

The purpose of this sequential explanatory mixed methods research was to explore individual teacher adoption patterns; specifically, their attitudes and motivations for implementing new technology into their classrooms. The study included data gathered from an initial Phase One online survey of teachers in elementary school settings nationwide, measuring their motivations, attitudes, and current and past technology practices. In order to best explore these factors, the survey included both quantitative and qualitative items. The goal of this study was to produce detailed findings of both early and late adopter's intrinsic and extrinsic motivations for adopting technology and describe their willingness and practices of technology integration within the classroom.

Central Guiding Research Question:

How does intrinsic and extrinsic motivation influence a teacher's decision to integrate technology in the classroom?

This research question was addressed through exploration of two sub-questions:

1. How do individual attitudes impact technology usage in the classroom?
2. How does resistance to changes and perceived or actual barriers affect an individual's ability to integrate technology?

This chapter presents the findings for each of the two phases of data collection: recorded online survey responses from 172 K-8 certificated elementary school teachers and eight one-on-one interviews. These findings are organized by phase and include demographic descriptions, qualitative findings of adopting technology in the classroom, and are followed by a thematic

analysis of the responses to open-ended survey items and one-on-one interview questions. Phase One data is presented first, followed by Phase Two data, and ends with the research findings.

Phase One Online Survey Findings

One hundred and seventy-two individuals participated in the online survey during November 2019. The online survey asked participants to reflect on their experiences integrating technology in their classroom settings as well as identify individuals with whom they typically reach out to when seeking support with technology-related issues. Additionally, participants were asked six professional demographic questions.

Demographics. Of the 172 surveys collected, not all participants responded to the six demographic items, therefore, the discussion of the demographic findings will reflect the exact number of responses as they pertain to each of the survey questions. Twenty percent (n = 29) stated that they are 30 years of age or younger. Thirty-four percent (n = 50) stated that they are between the ages of 31 to 45 years of age. Teachers who identified as being older than 45 (n = 66) made up the largest subgroup at 46% of the total participants.

Total number of years teaching. Figure 6 displays the reported total number of years teaching arranged into five-year increments. Of the 172 respondents, 1 to 5 years teaching experience was reported as the highest percentage with 21% (n = 31) followed by 21 to 25 years teaching experience with 19% (n = 27). Percentages decrease during the 11 to 15 years range and after 25 years. Seven percent (n = 10) of the participants reported teaching 31 years or longer.

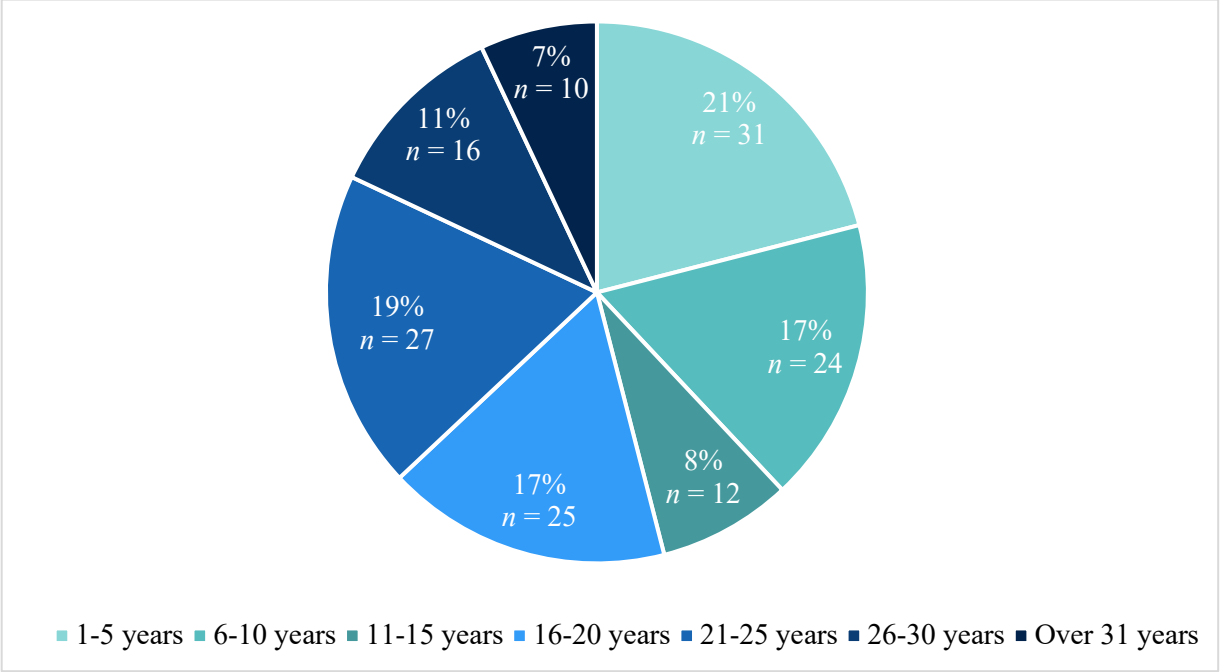


Figure 6. Frequency distribution of the total number of years teaching experience ($N = 145$).

Current grade level assignment. The total number of response rates were higher for this question ($n = 177$) than the previous two questions because 16 respondents selected more than one grade level as their current assignment due to teaching combination (combo) classes. Figure 7 shows a breakdown of current single grade level assignments ranging from kindergarten to sixth grade only. Second, third, and fourth grades were the highest reported current grade level assignments with 22% ($n = 39$), 20% ($n = 36$), and 19% ($n = 33$) respectively. Combo classes comprised 11% of the total number of individual responses ($n = 16$) with 28% ($n = 50$) of the total 177 grade level selections making up one of three types of grade level combinations: three teachers indicated that they teach in a K-6 combo class, 10 teachers reported that they teach in a two grade level combo class, and three teachers reported teaching in a three grade level combo class. Subsequently, zero participants indicated currently teaching seventh or eighth grade.

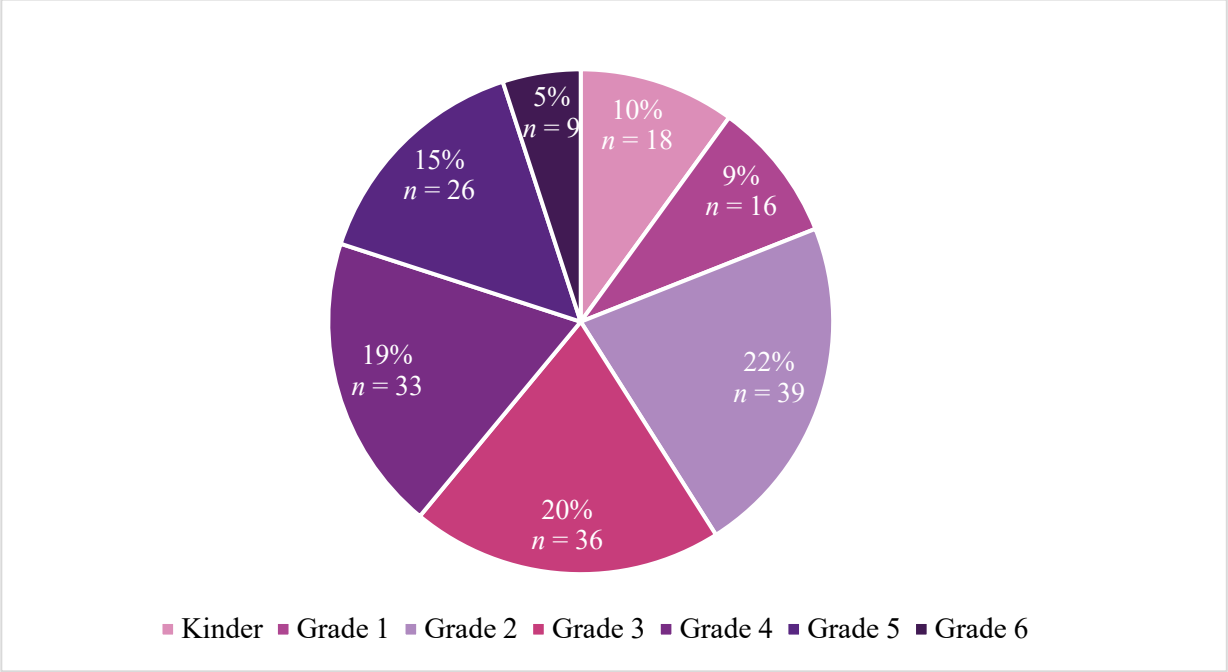


Figure 7. Frequency distribution of the participant's current grade level assignment ($N = 177$).

Teaching experience. Respondents were asked to select all grade levels that have been taught in their reported years of teaching as certificated K-8 elementary teachers. Figure 8 depicts the breakdown of the 544 grade levels selected by the 145 respondents. All nine grade levels have been arranged into three groups based on similar percentages and total number of responses. Second (16%; $n = 89$), third (16%; $n = 85$), fourth (16%; $n = 85$), and first (15%; $n = 79$) grades were reported as being the grade levels the teachers have the most experience teaching with a combined total of 63% ($n = 338$) of the 544 selections. Thirteen percent ($n = 68$) and 12% selected fifth grade ($n = 64$). The least selected grade levels were sixth (7%; $n = 39$), seventh (3%; $n = 19$), and eighth (3%; $n = 16$) grades, respectively.

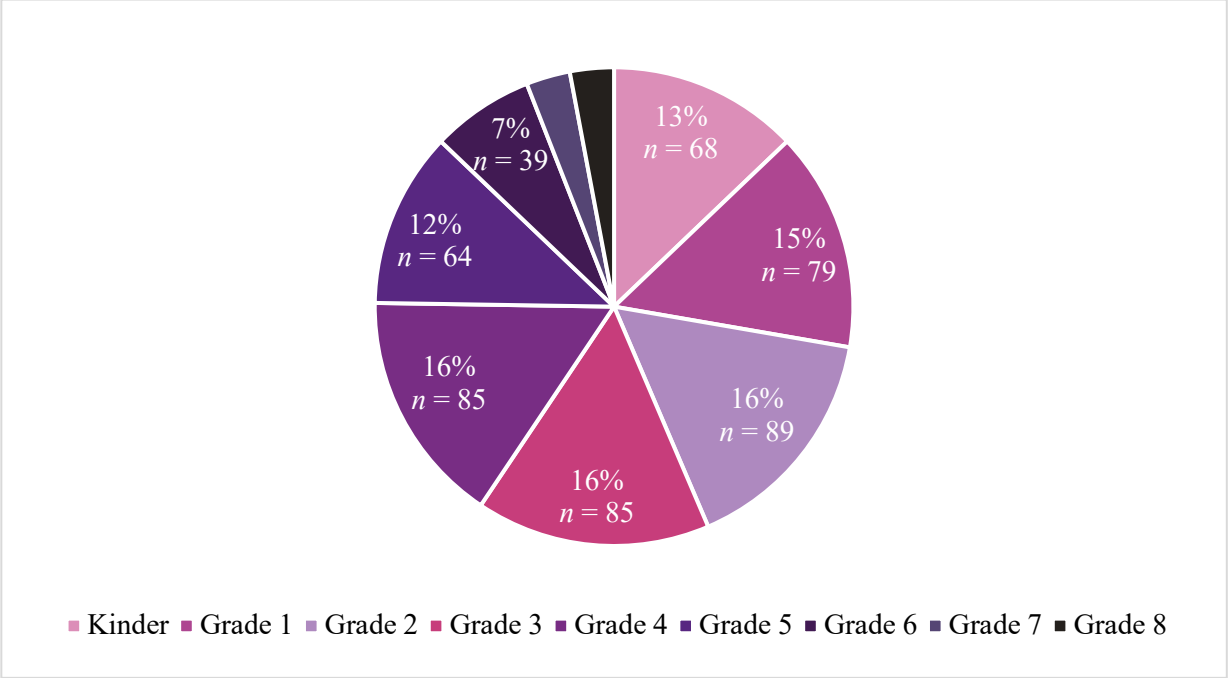


Figure 8. Frequency distribution of the participant's teaching experience ($N = 544$).

Highest degree obtained. Fifty-eight percent ($n = 84$) of the population ($n = 145$) reported as having obtained a master's degree, 37% ($n = 53$) reported earning a bachelor's degree, and 6% ($n = 8$) indicated earning a doctoral degree. Figure 9 shows the cross-tabulation of the *highest degree obtained* and the *total years taught* of the 145 respondents. A greater number of teachers began their teaching career with a bachelor's degree as their highest level of degree completion; however, as they increased in years teaching, the number of graduate degrees increased as well. The number of master's degrees earned peaked twice, first beginning at the 6 to 10 years range (18%; $n = 15$) and then again at the 21 to 25 years range (23%; $n = 19$); then dropping after both ranges. Similarly, there was clear evidence that the doctoral degree from highest degree obtained (85%; $n = 7$) aligned with age the ranges of 30 to 45 years and 45 years and older and teaching beyond the 16 to 20 years range.

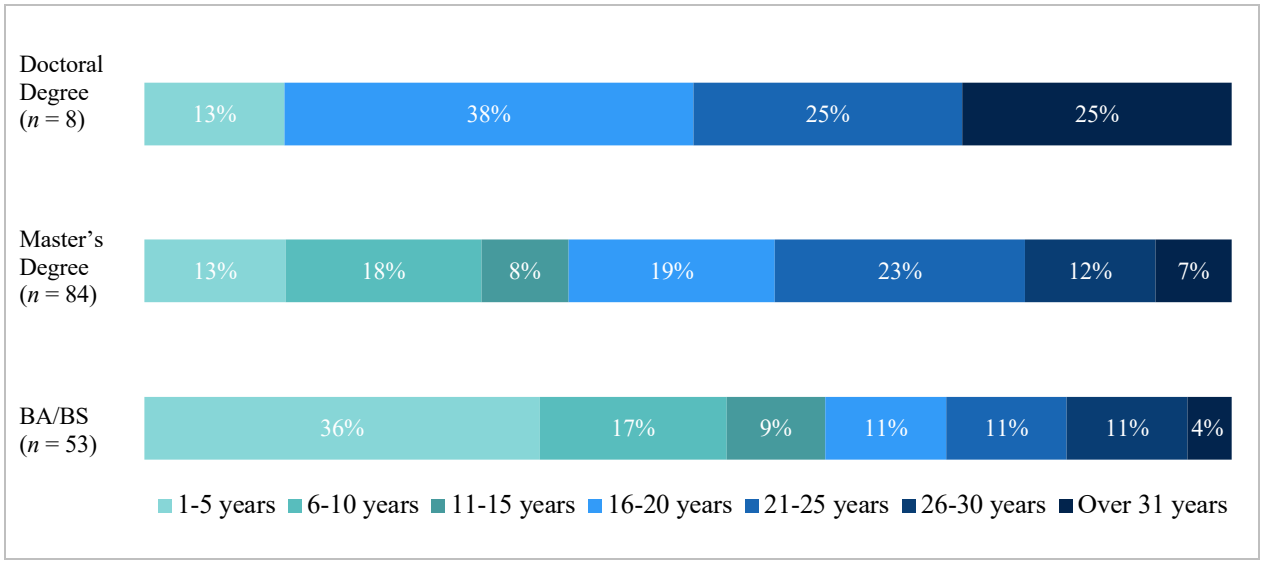


Figure 9. Frequency distribution of the highest academic degree obtained cross-tabulated with total years of teaching ($N = 145$).

In exploring the largest represented age group (over 45 years) of the sample, the highest level of education achieved for this subgroup was a doctoral degree (63%; $n = 5$).

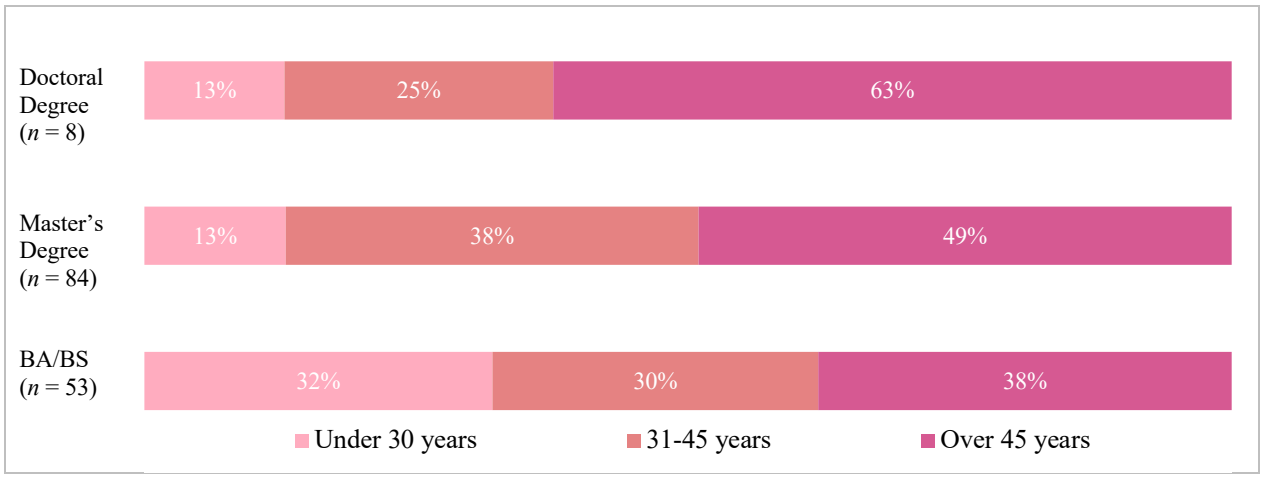


Figure 10. Frequency distribution of the highest academic degree obtained cross-tabulated with age range of participants ($N = 145$).

Additionally, the number of bachelor's degrees earned increased across the age ranges, from 17 (32%) in the 30 years or less range to 20 (38%) in the 45 years and older range, due to clear evidence that a majority of participants in the study falling within the 45 years and older range. The number of master's degrees earned by the younger population (30 years and younger) drops to 13% (n = 11) however, increased by the 45 years and older range to 49% (n = 41).

Length of time from highest degree completion. Within the survey, the participants were asked to report the length of time since their highest degree. Thirty-nine percent (n = 56) of the 145 respondents reported having completed their highest degree more than 10 years ago while only 7% (n = 10) of the participants reported currently being enrolled in a degree program.

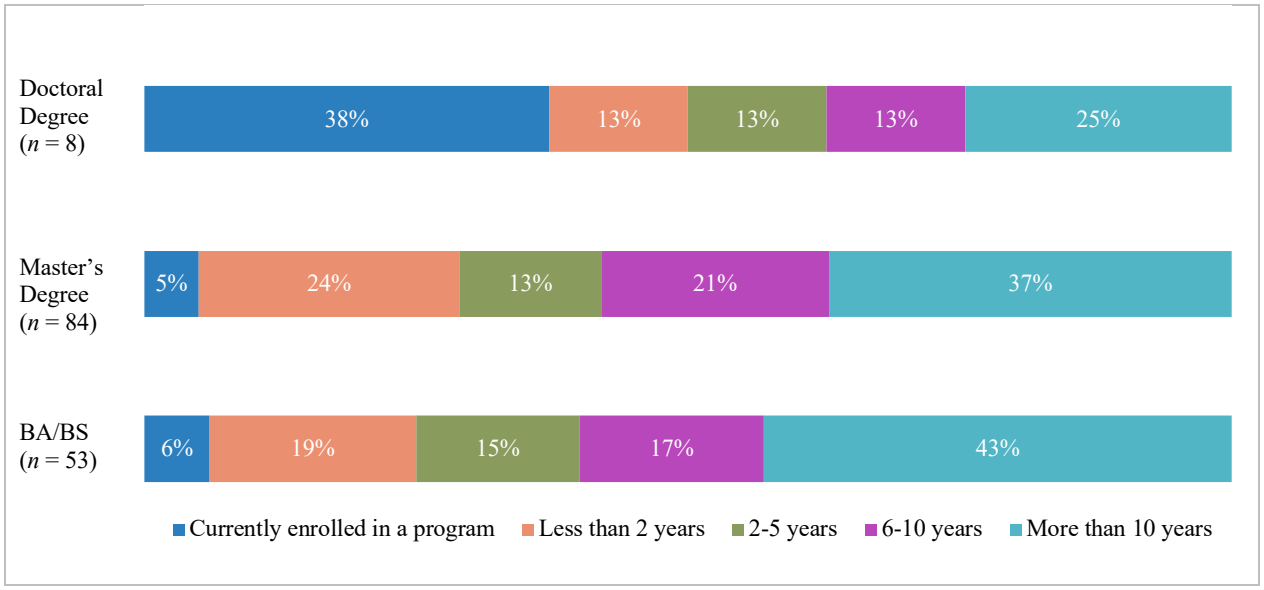


Figure 11. Frequency distribution of the length of time from degree completion cross-tabulated with highest degree obtained (N = 145).

As shown in Figure 11 above, 10 individuals reported as currently being enrolled in a degree program; four are in their master's program, three are enrolled in a bachelor's program, with the remaining three enrolled in a doctoral degree program.

Scaled findings. Within the Phase One online survey, 11 items asked for responses to a scale. Nine involved a 5-point Likert Scale ranging from *Totally Agree* to *Totally Disagree*. Two other items involved either a Frequency of Use Scale or a Value Scale. Of the 172 surveys collected, not all participants responded to all the survey questions; therefore, the discussion of the findings reflects the exact number of responses as they pertain to each question. The 11 quantitative survey items are arranged into three main themes: Adoption Intention, Adoption Propensity, and Technology Support; each with their own subthemes. Additionally, each theme, with their coordinating subthemes, survey item analysis, and figures are represented below.

Adoption intention. This section was comprised of six questions each focusing on a separate subtheme of adoption intention: usefulness, ease of use, experience, learning opportunities, relationship to curriculum, and technology usage intention. Each of the 172 K-8 certificated elementary participants were asked to rate multiple statements under each of the subsections, using either a Likert Scale or a Frequency of Use Scale.

Usefulness. Participants were asked to rate the usefulness of technology in their job: (a) technology is useful in my job, (b) technology skills are relevant in my job, (c) technology enhances my effectiveness in my job, (d) technology improves the quality of my job, and e) technology increases the productivity of my job. Overall, a majority of all respondents (n = 170) reported *Totally Agree* or *Agree* across all items as indicated by the breakdown in Figure 12. A majority of participants (76%; n = 129) rated *Totally Agree for* technology is useful in their job. Similarly, 69% (n = 116) of participants rated *Totally Agree* that technology skills are relevant to their job. Technology enhances the effectiveness in their jobs was rated as *Totally Agree* or *Agree* with a combined total of 94% (n = 159). Ninety-one percent (n = 153) rated *Totally Agree*

or *Agree* that technology improved the quality of their jobs. Similarly, 93% (*n* = 158) also agreed that technology improves the productivity of their job.

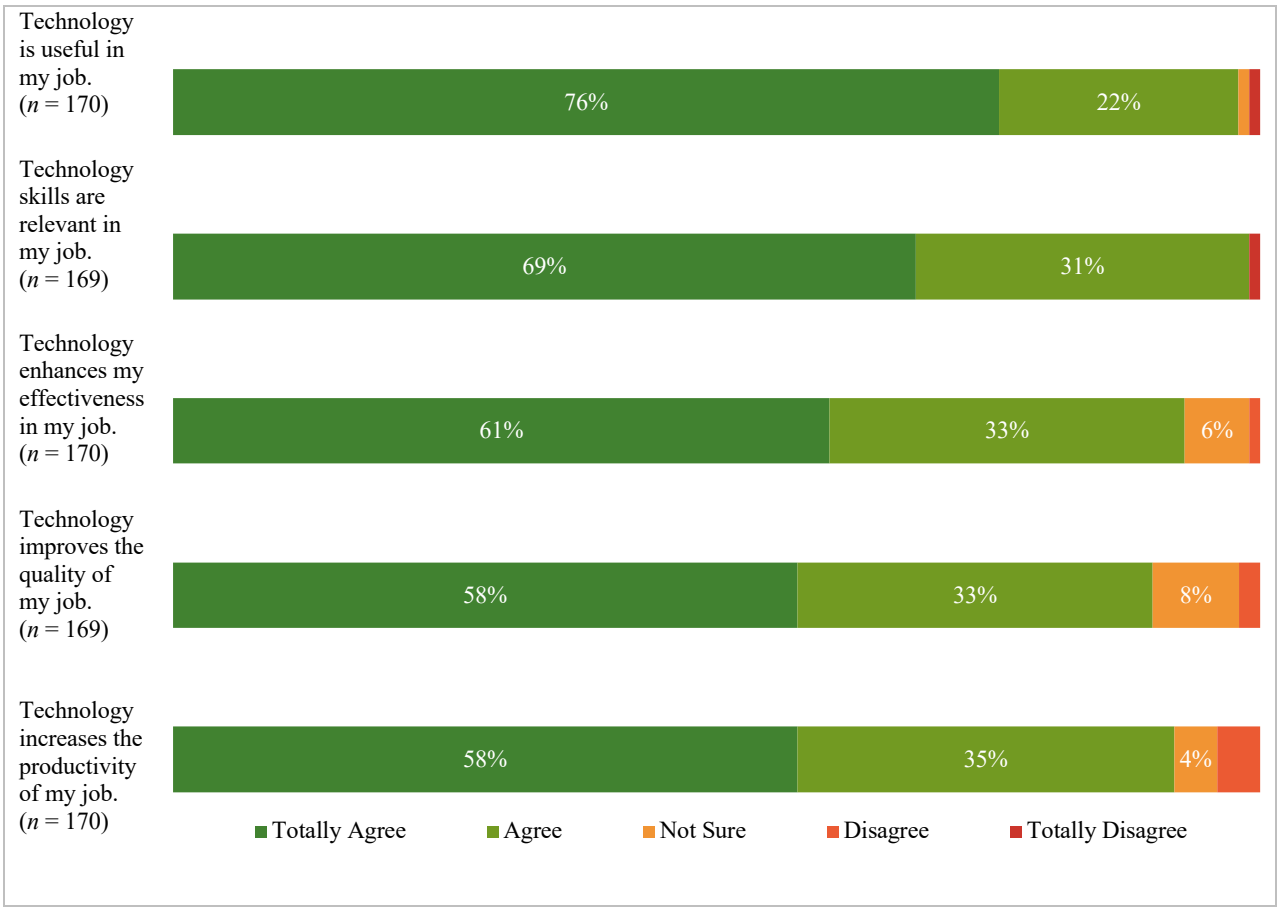


Figure 12. Frequency distribution of the perceived usefulness of technology in participant's jobs (*N* = 170).

Ease of use. Participants were asked to rate technology as they believe it relates to its ease of use in their classroom setting: (a) I know how to use technology in the classroom setting and (b) I possess the necessary skills to use technology in the classroom setting. Overall, a majority of all respondents (*n* = 169) reported *Totally Agree* or *Agree* across all items under the ease of use subsection as shown in Figure 13. A total of 161 participants (95%) stated they know

how to use technology in the classroom. Additionally, 91% (n = 153) of all respondents believe they possess the necessary skills to use technology in the classroom.

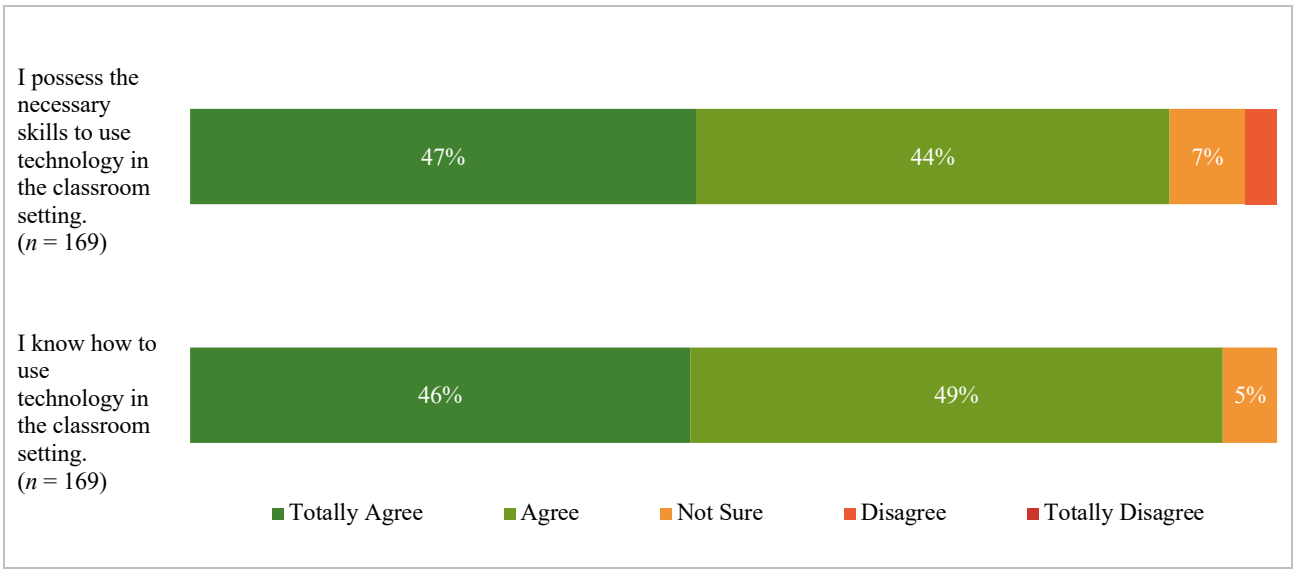


Figure 13. Frequency distribution of the perceived ease of technology use in the classroom (N = 169).

Experience. Participants (n = 167) were asked to rate the frequency of specific technology device usage to deliver lessons in their classroom from *Never Use It* to *At Least Once Per Day*: (a) I use an LMS, like Blackboard or Canvas, to prepare my lessons, (b) I use digital resources, such as: ebooks, videos, and digital slides; to deliver my lessons, (c) I use a SmartBoard of LCD projector when delivering my lessons, and (d) I have my students use devices as part of my instruction. LMS platforms, such as Blackboard or Canvas were reported as *Never Used* by 78% (n = 130) of the participants. Most participants (80%; n = 133) selected *Once Per Week* or *Once Per Day* in using digital resources such as ebooks, videos, and digital slides to deliver lessons (see Figure 14). A majority of respondents (95%; n = 156) reported having used a SmartBoard or LCD projector when delivering lessons *At Least Once Per Day*

(90%; *n* = 148) or *Once Per Week* (5%; *n* = 8). A majority of respondents (89%; *n* = 147) reported having their students use devices as part of the instruction *At Least Once Per Day* (58%; *n* = 96) or *Once Per Week* (31%; *n* = 51).

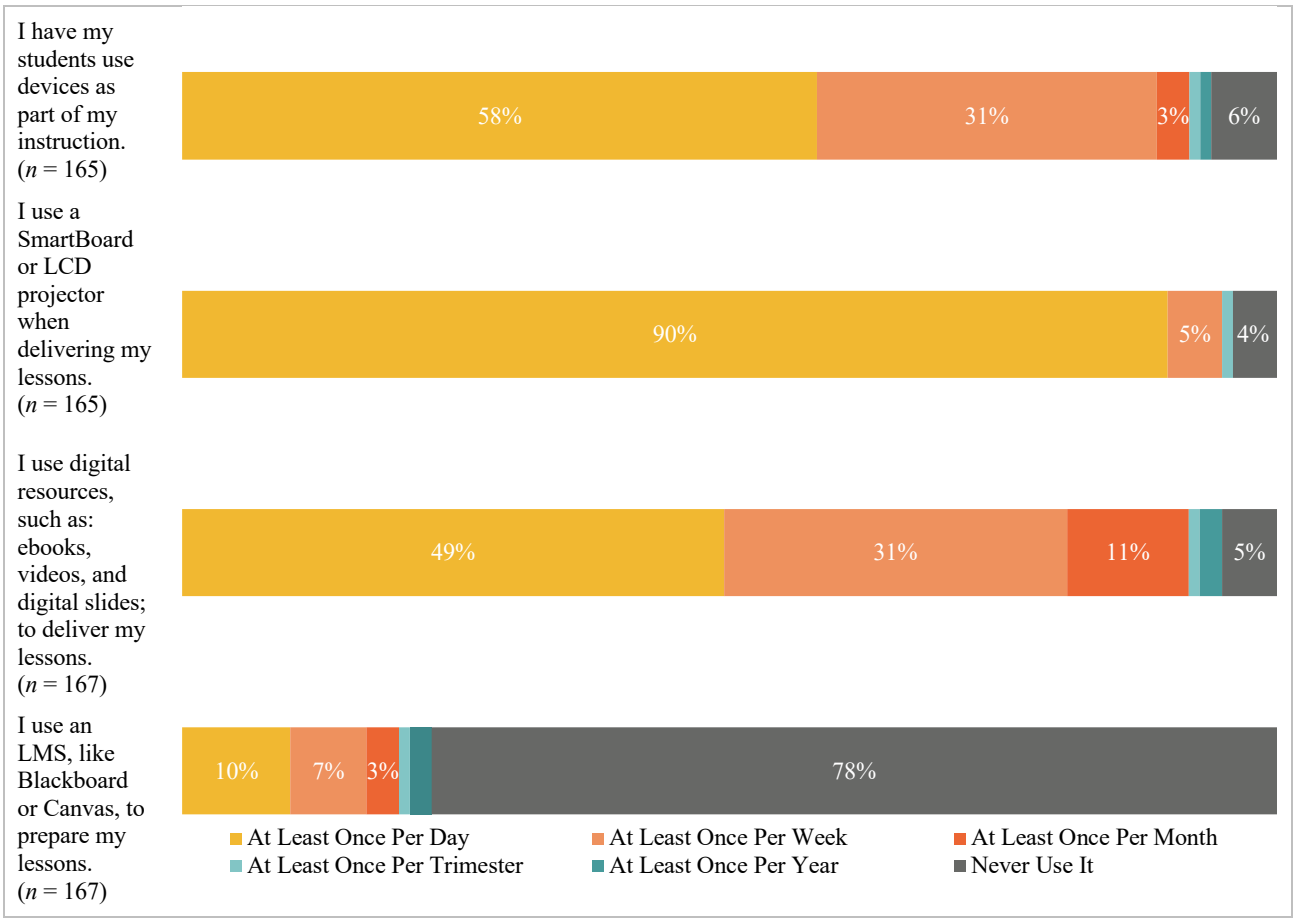


Figure 14. Frequency distribution of use of LMS, digital resources, SmartBoards, projectors, and student devices usage in the classroom (*N* = 167).

Learning opportunities. Participants were asked to rate technology's ability to enhance learning opportunities and the learning process: (a) technology enhances learning, (b) technology gives more me control over the learning process, (c) technology provides more access and options for learning, (d) technology helps unify learning concepts, (e) technology improves critical thinking, and (f) technology motivates students to learn. Ninety-three percent (*n* = 155) of

the respondents believed that technology enhances learning (see Figure 15). Over half of the participants (n = 113) agreed that technology gives them more control over the learning process.

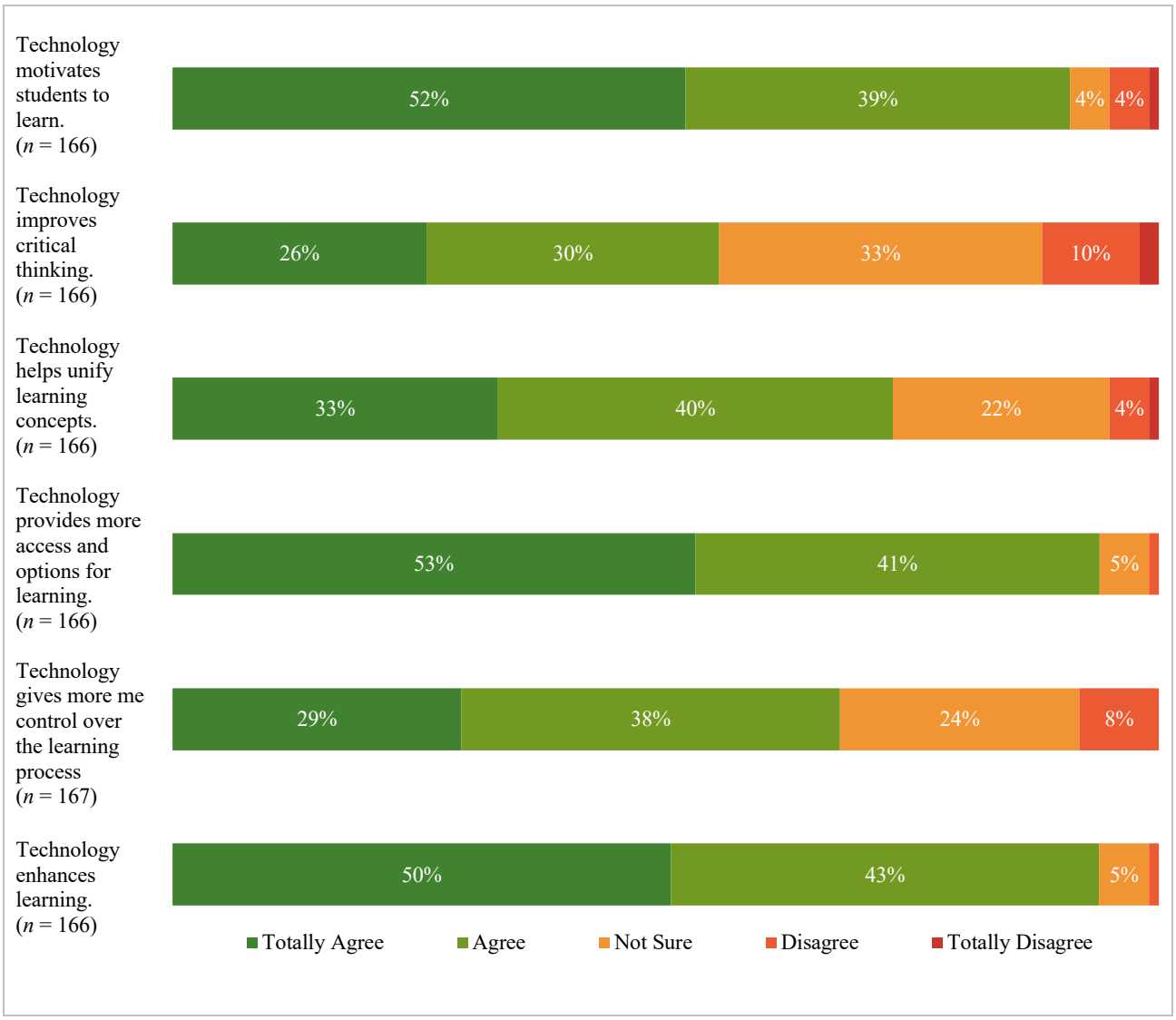


Figure 15. Frequency distribution of the perceived influence of technology on learning opportunities (N = 167).

On average, a majority of participants (n = 166) believed technology provided more access and options for learning with 94% (n = 156). Approximately 75% of the participants (n = 122) were in agreement that technology helps to unify learning concepts. Not everyone agreed with the

phrase, technology improves critical thinking, as depicted in the 33% (n = 55) of *Not Sure* responses. However, 91% of respondents (n = 152) agreed with the phrase, technology motivates students to learn.

Relationship to curriculum. Participants were asked to rate the relationship with technology and their current curriculum: (a) my adopted curriculum allows me to easily incorporate technology and (b) I understand how to leverage technology to enhance my curriculum. Most participants (80%; n = 133) agreed that their adopted curriculum allowed them to easily incorporate technology (see Figure 16). Similarly, 82% (n = 136) of the participants also expressed that they understood how to leverage technology to enhance their curriculum.

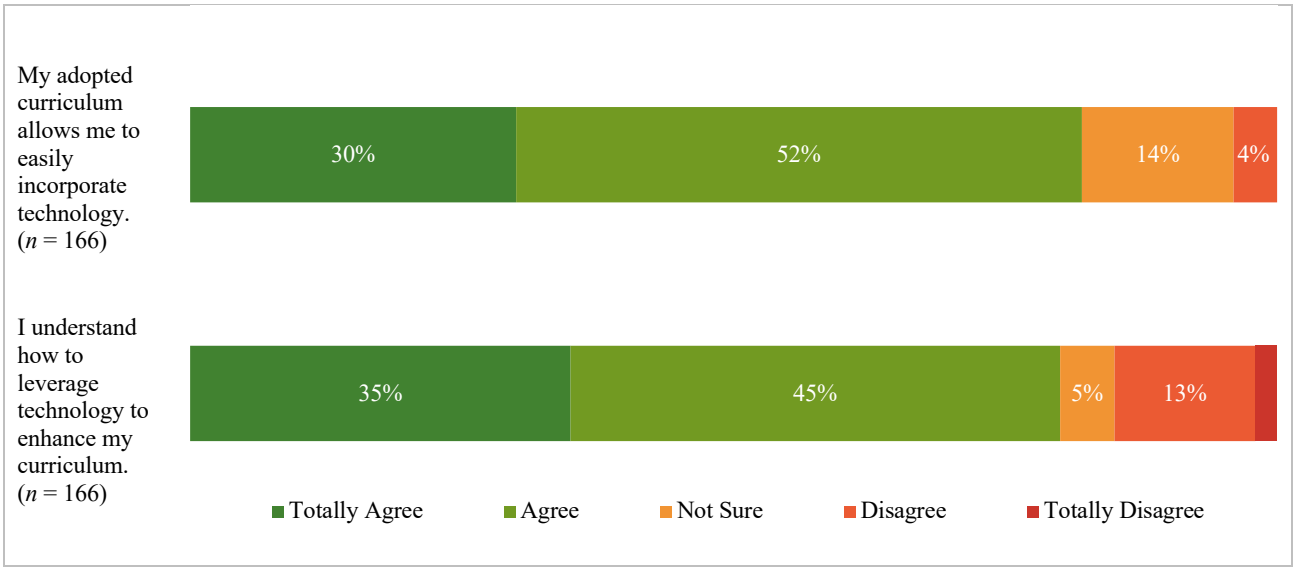


Figure 16. Frequency distribution of the perceived relationship technology has to curriculum (N = 166).

Technology usage intention. Participants were asked to rate technology as they believe it relates to the benefits of integrating technology: (a) I see the value of integrating technology into my instruction, (b) technology integration is critical to student success, (c) I feel obligated to use

technology in my classroom, (d) I enjoy being acknowledged as a technology expert, (d) learning new technologies is fun and enjoyable, and (e) I enjoy finding new ways to leverage technology in my classroom.

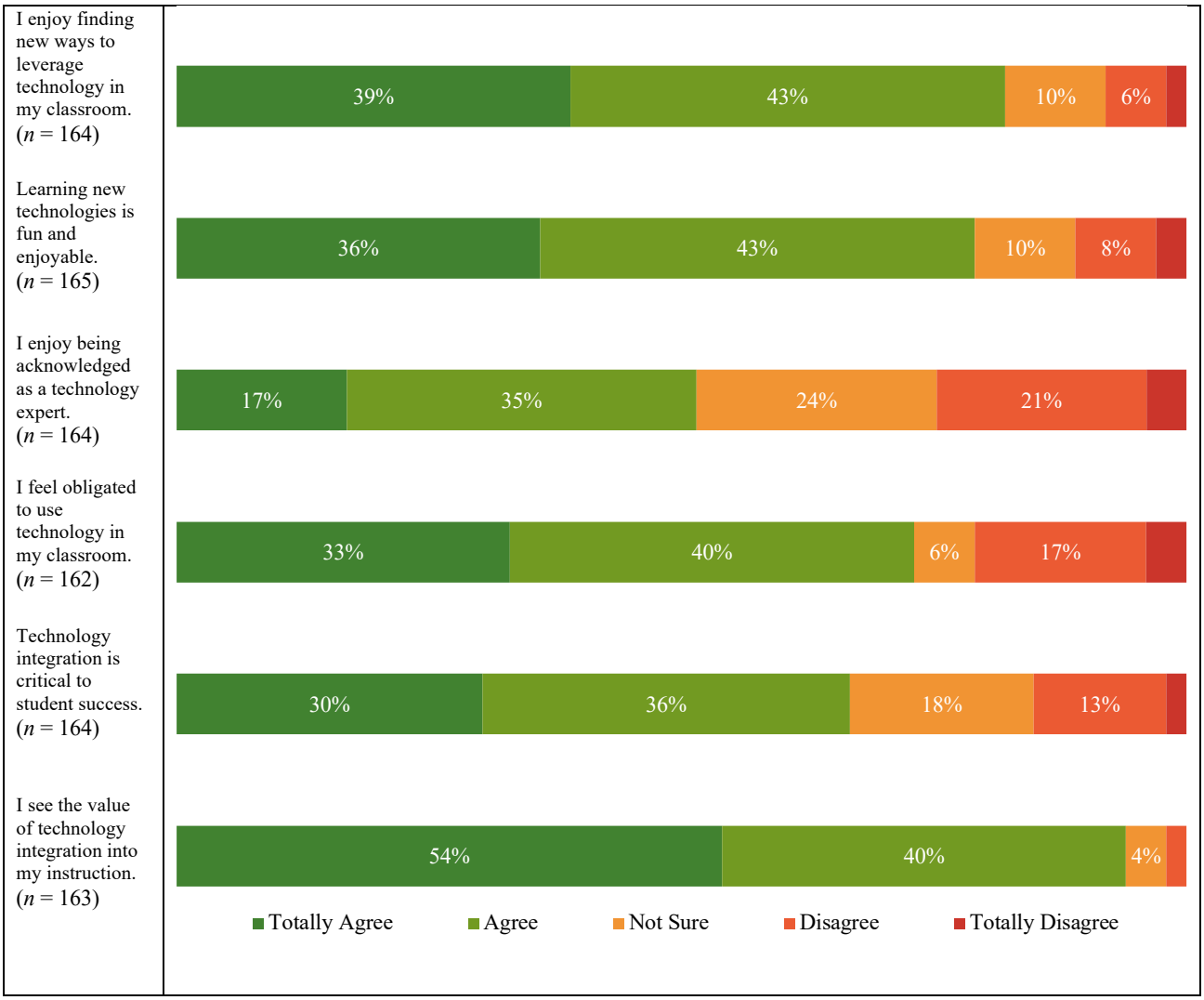


Figure 17. Frequency distribution of the perceived value of integrating technology in the classroom ($N = 165$).

Overall, most of the respondents selected *Totally Agree* or *Agree* with seeing the value of integrating technology with instruction (94%; $n = 153$) and expressed enjoyment in finding new ways to leverage technology in the classroom (82%; $n = 134$), as depicted in Figure 17 above.

Additionally, 79% of respondents (n = 130) indicated that learning new technologies is fun and enjoyable. Seventy-three percent of respondents (n = 119) articulated feeling obligated to use technology in the classroom while just over 20% (n = 34) felt the opposite. The statements technology is critical to student success and I enjoy being acknowledged as a technology expert yielded more balanced responses between agreement and disagreement, signifying conflicting perspectives among the participants.

Adoption propensity. This section was comprised of four questions each focusing on a separate subtheme of adoption propensity: optimism, proficiency, dependence, and vulnerability. Each of the 172 K-8 certificated elementary participants were asked to rate multiple statements under each of the subsections, ranging from *Totally Agree* to *Totally Disagree* as indicated in their respective figures below.

Optimism. Participants were asked to rate technology as they believe it relates to daily life: (a) technology gives me more control over my daily life, (b) technology helps me make necessary changes in my life, (c) technology allows me to more easily do the things I want to do at the times I want to do them, and (d) new technologies make my life easier. Overall, a majority of all respondents (n = 160) reported *Totally Agree* or *Agree* across all items under the optimism subsection, as indicated in Figure 18, indicating a positive relationship between technology usage and managing one's life.

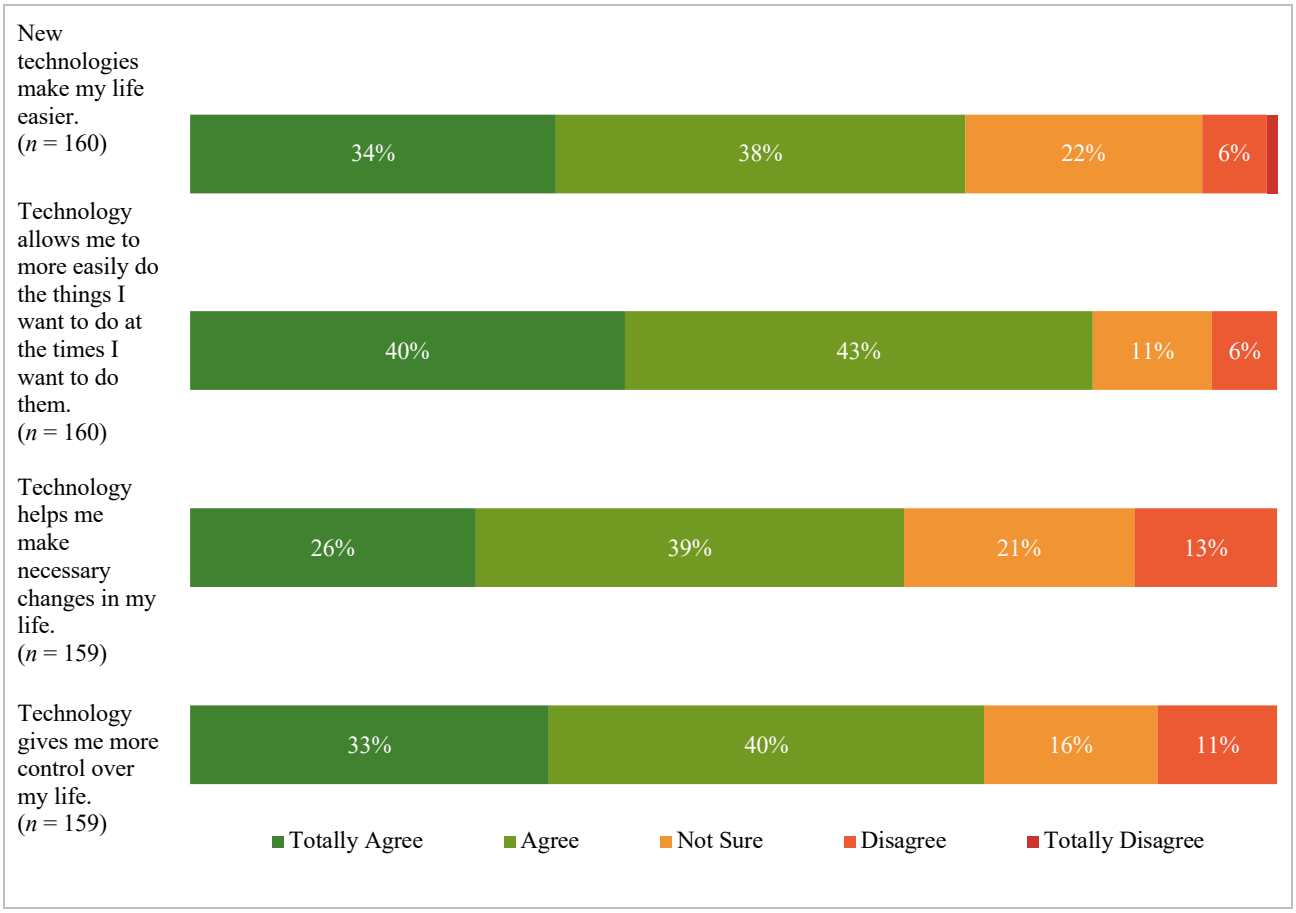


Figure 18. Frequency distribution of the perceived level of optimism as a result of the effects of using technology in one's life ($N = 160$)

Proficiency. Participants were asked to rate their proficiency in learning and teaching others new technologies: (a) I can figure out new high-tech products and services without help from others, (b) I seem to have fewer problems than other people in making technology work, (c) other people come to me for advice on new technologies, and (d) I enjoy figuring out how to use new technology. More than 65% of all respondents ($n = 157$) reported *Totally Agree or Agree* across all items under the proficiency subsection as depicted in Figure 19; denoting participants identify as experiencing some degree of proficiency or expertise.

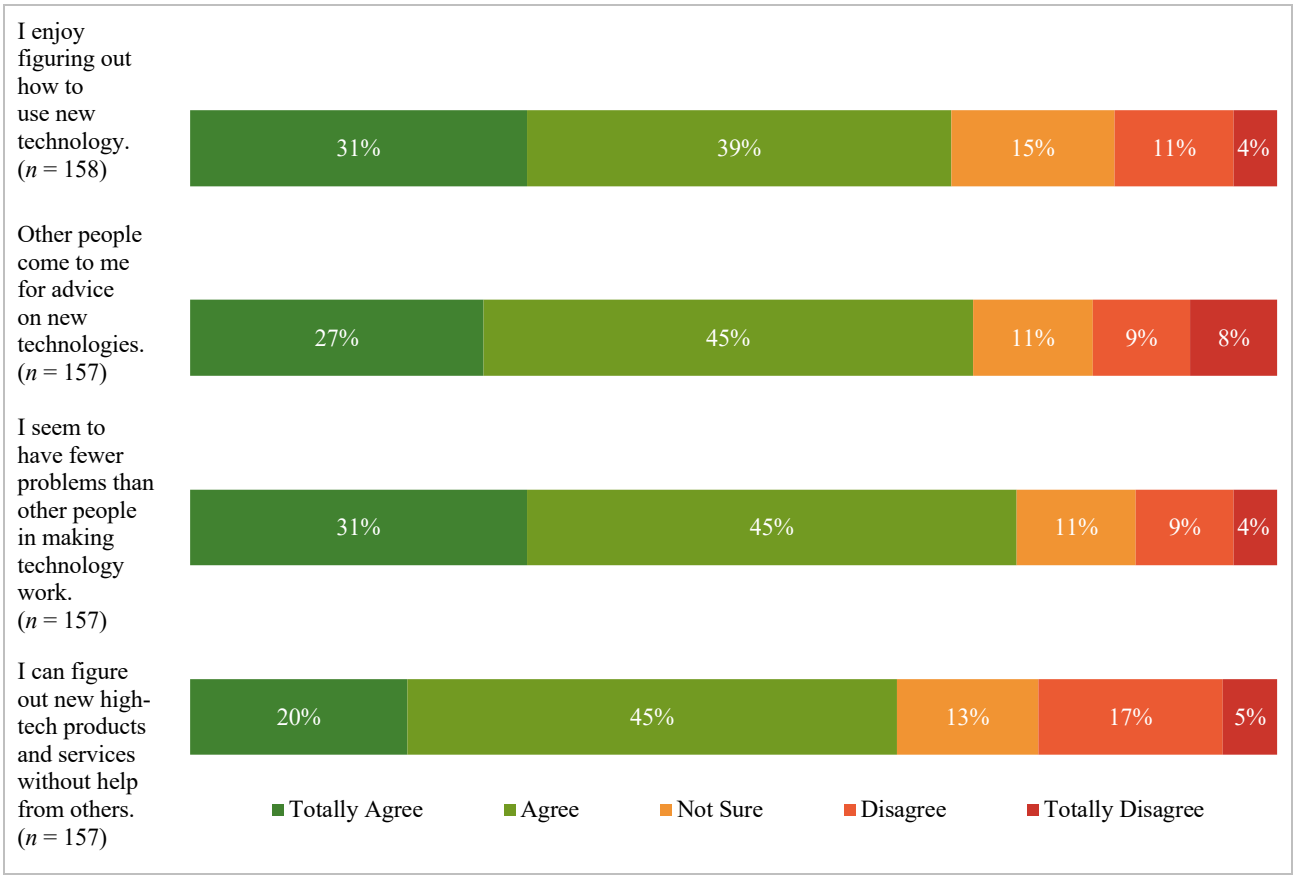


Figure 19. Frequency distribution of demonstrating proficiency with leveraging technology ($N = 158$).

Dependence. Participants were asked to rate their perceived dependence on technology and the control that it has over their lives: (a) technology controls my life more than I control technology, (b) I feel like I am overly dependent on technology, and (c) the more I use a new technology, the more I rely on it. Although 66% ($n = 101$) of the participants believe the phrase the more they use technology the more they rely on it; only 28% ($n = 44$) agree with the statement that technology controls my life more than I control technology. Figure 20 illustrates that all participants were almost evenly split between believing they were overly dependent on technology (39%; $n = 62$) and not (43%; $n = 68$). Additionally, 17% ($n = 26$) reported *Not Sure*.

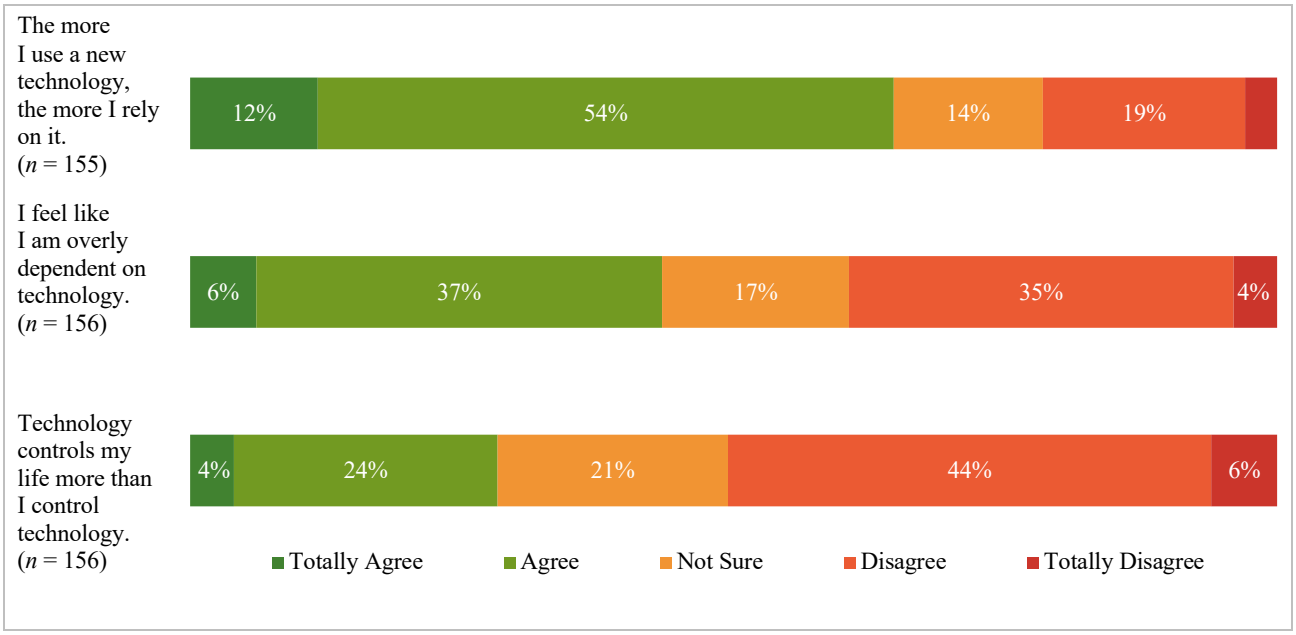


Figure 20. Frequency distribution of demonstrating reliance or dependence on technology in everyday life ($N = 156$).

Vulnerability. Participants were asked to rate their beliefs of being vulnerable or receiving unwanted attention as it relates to technology: (a) I must be careful when using technology because cyber criminals may target me, (b) new technology makes it easy for companies and other people to invade my privacy, and (c) high-tech companies convince us that we need things that we don't really need. As indicated in Figure 21, more than half of all respondents ($n = 154$) reported feeling a high rate of security from being targeted by big companies invading their privacy or cyber criminals targeting them. However, the percentages associated with *Not Sure* responses (21%; 18%; 23%) are greater in this survey item than in previous survey items; indicating that participants experience some level of apprehension towards feeling safe online and vulnerability in their cyber-security plans.

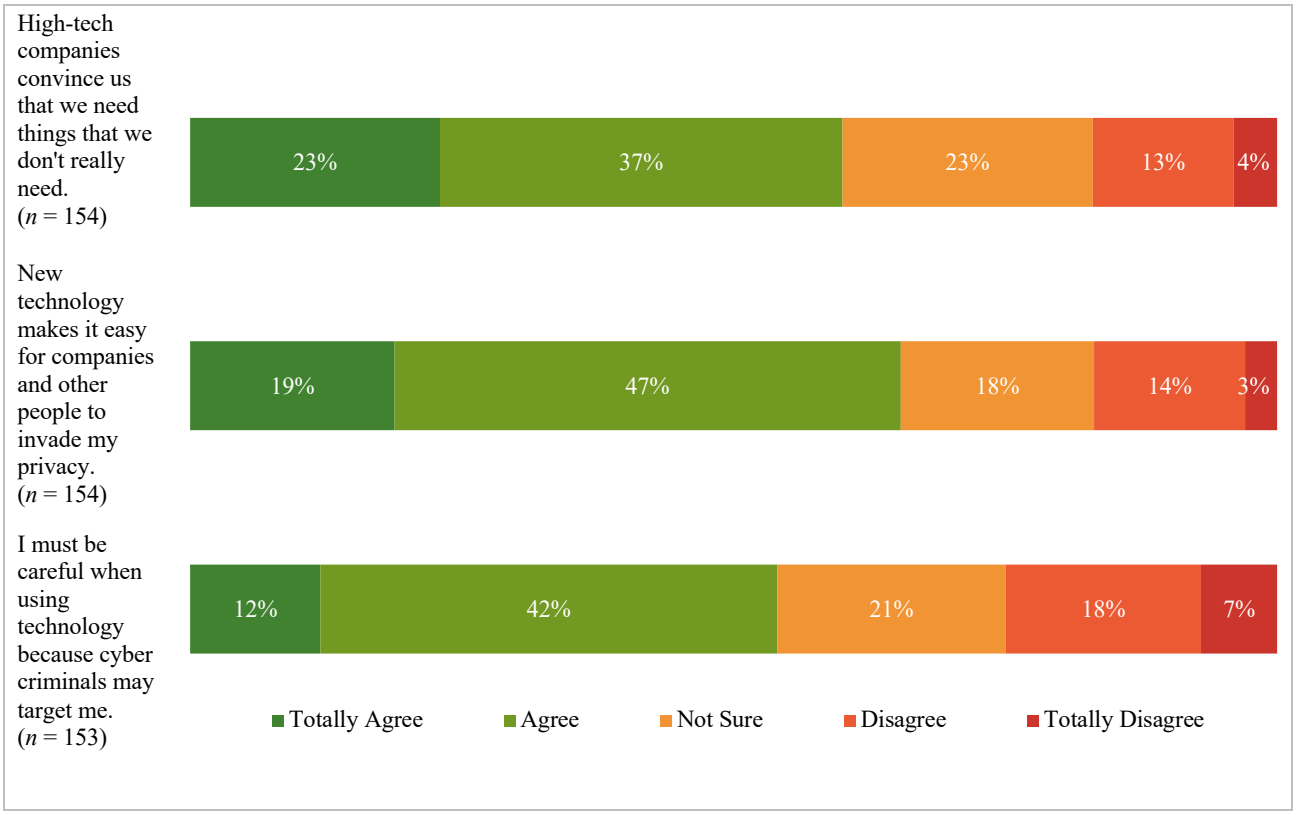


Figure 21. Frequency distribution of experiencing vulnerability with privacy from technology ($N = 154$).

Technology support. The 172 K-8 certificated elementary teacher participants were asked, "When seeking support for technology related issues, how would you rate the value of each?" Eight options for responses were provided including: (a) help desk/IT department, (b) colleagues, (c) students, (d) TSA's (teachers on special assignments), (e) online search, (f) online support groups, and (g) individual troubleshooting. One hundred and fifty-two participants responded to this question and rated each item based on the value of support they received using the scale: not used, not valuable, somewhat valuable, and very valuable.

As indicated in Table 2, colleagues had the highest value ranking reported for *Very Valuable* ($n = 80$), online searches ($n = 75$) were the second highest reported, with the help

desk/IT department reported third highest (n = 55). Additionally, 73 of the participants reported not seeking support from teacher's on special assignment, nor did they find online support groups helpful in solving technology related issues since 50 of the participants reported *Not Used* for this item.

Table 2

Value of Technology Support Network (N = 152)

Support Network	Types of Support	Not Used (n)	Not Valuable (n)	Somewhat Valuable (n)	Very Valuable (n)
	Help Desk/ IT Department	9	13	75	55
	Colleagues	2	2	67	80
	Students	10	15	96	29
	TSA's	73	7	57	13
	Online Search	1	3	73	75
	Online Support Groups	50	9	59	34
	Individual Troubleshooting	7	9	95	41

Phase One Thematic Findings

Within the Phase One online survey, four of the 21 survey items requested participants answer short-response questions sharing their thoughts and perspectives on the integration of technology in their classroom and workplace settings; as well as further explanation for their response to a previous survey item identifying their technology support network. Of the 172 participants, most responded to the four open-ended items. Responses were coded and resulted in a total of 1,273 coded passages which were further categorized into the following five themes: a)

attitudes toward adoption, b) barriers/challenges to technology, c) learning, d) supports, and e) technology integration. All five themes, their coordinating subthemes, and coded passage counts are represented in their respective tables, followed by subtheme analyses and the inclusion of direct quotes of the participants. Given the broad representation of views from all subjects, the direct quotes are not specifically linked to the individual respondents.

Theme 1: Attitudes toward adoption. Phase One participants were asked to reflect on their current and past experiences with technology adoption practices, both personally and in their workplace setting. Through the responses provided, Table 3 displays four subthemes regarding their attitudes, habits, and tendencies on adopting technology emerged: (a) balance, (b) early adopter tendencies, (c) frustrations, and (d) late adopter tendencies. Of the 1,273 total coded passages, these four subthemes generated a total of 254 coded passages.

Table 3

Attitudes Toward Adoption Thematic Findings (N = 254)

Theme	Subthemes	Technology Support (*n*)	Frustrations (*n*)	Tech Use & Effectiveness (*n*)	Technology Integration (*n*)
Attitudes Toward Adoption	Balance	0	0	0	1
	Early Adopter Tendencies	13	7	17	6
	Frustrations with Technology	12	77	3	71
	Late Adopter Tendencies	9	21	7	8

Balance. When asked to share their thoughts and perspectives on the integration of technology in their classroom, one respondent noted that in order to more effectively integrate technology in the classroom better balance between work and home is crucial.

> I would integrate technology more consistently if I was given a small block of time weekly or monthly devoted to planning for upcoming lessons and opportunities where I might want to incorporate technology. Normally, I am forced to do this on my own time which takes away from my family and social life.

Early adopter tendencies. Most of the 43 coded participants' responses were similar in nature and pointed to tendencies common to innovator-type individuals who typically adopt technology earlier than their counterparts. These three individuals shared common tendencies of being highly motivated and self-directed learners.

> I am a hands-on person; just show me how and I can do it for myself.

> I tend to use online searching to fix my technical issues because I can understand the basics of what I am using; and it tends to be quicker than waiting for Sysop [IT] to come and assist with my issues.

> I feel I am self-sufficient when using technology and I am often times asked questions about technology.

Responses such as the following are reminiscent of individuals who display positive attitudes towards technology.

> I can also learn from their mistakes with the technology.

> It [technology] has endless possibilities for all subjects.

> When I plan with my ET colleague, she is able to make suggestions and see possible pitfalls on the tech side that I might not foresee.

> Using it [technology] every day and learning from mistakes.

Many of the respondents also shared a common thread of having a strong desire to enhance their students' learning experience through the purposeful integration of technology as depicted in the following statements.

> Research supports games as being the easiest way to cement learning because it takes less time and fewer at bats to create a new synapse in the brain.

> I love to use animated timers with visuals to help my students pace their independent and partner work. Allowing my students to have the option to type or hand write motivates them and allows them to produce better work.

Frustrations with technology. One hundred and sixty-three of the 254 coded passages represented within this theme were coded to reflect the participating educator's frustrations with technology-related issues in the classroom and workplace setting. Upon further inspection and with the understanding that the term "technology" is rather broad, several underlying threads were identified and categorized in the following manner: (a) learning curve, (b) lack of support, (c) device/infrastructure issues, (d) hardware and supplemental resources limitations, and (e) mandated constraints.

Learning curve frustrations were documented by ten participants who experienced frustrations due to technology-related learning curves, as noted by the following comments.

> There is little time and most teachers don't use technology at all because there is a huge learning curve.

> I don't know how to use technology and am required to use it daily.

> It's hard to know what to ask for help on when you don't know what all is out there.

While another participant reported that the students are quicker at navigating the learning curve than the teacher.

> It's hard to monitor 25 students on devices to make sure they are doing what they should be. They are quick swipers when you come near.

A source of much frustration among teachers, many reported a lack of IT support onsite while others reported frustration with the quality and length of time it takes district personnel to provide support. Several respondents reported:

> Most of the time it is a lot faster to ask a colleague than wait for an email from an IT coordinator.

> Lack of IT support that understand the use of technology in teaching.
>
> A competent district IT person that actually cares about their job.
>
> When tech support comes out, they usually treat you like you're a dummy for not knowing how to fix something.

Frustrations with lack of proper training and follow-up support were among the most recorded.

> If it is in my classroom and you expect me to use it then I need to be taught how to use it and what is expected from it.
>
> Our district never provided training to teachers on how to use SCRATCH themselves before expecting us to teach 12 lessons a year.
>
> I need training in a small group setting with people who are more beginners like me.

Others expressed frustration in the form of resistance.

> If I only communicate with a computer-generated response I typically go elsewhere for assistance or I won't use that technology or application.

Device/infrastructure issues accounted for 68 of the coded passages found within this thread relating to issues around antiquated/defective devices, hardware, or equipment as well as inadequate infrastructure. Shared frustrations with interrupted lessons, wasted time, and loss of student concentration are among the largest reported outcomes of the technological shortcomings experienced by the respondents as the following statements support.

> It's frustrating when things don't connect or sync up correctly. Sometimes it feels like I spend more wasted time on trying to get some aspect of technology to work than I do on actually teaching my lesson.

And:

> I have horrible WiFi which can make using technology a challenge. I often lose connection or get blocked from some sites.
>
> When the internet is down it feels like all your hard work preparing is for nothing because you can't do what you planned.

Less restrictions on websites and programs rated high among infrastructure-related frustrations as the following statement sums up many of the responses.

> The school system I am in is extremely restrictive and all sites/apps that students will use must be vetted via a lengthy process that is counterproductive and rarely results with an addition to the 'Approved List.'

Hardware and supplemental resources limitations created frustrations relating to shortages of one-to-one devices and a general need for a *higher technology* to *student* ratio as summed up by one comment representing a common theme for all sixteen respondents.

> My biggest frustration with using technology in the classroom is that there isn't enough for the students. We are not one-to-one. We have two chrome [book] carts for the grade level of six classes.

Furthermore, many participants reported frustrations with inadequate supplemental resources, such as curriculum, to use in their lesson planning.

> I'm exhausted in 'chasing' down materials.
>
> More user-friendly technology components with adopted curriculum.

Mandated constraints were expressed most vividly within the category of *frustrations with technology*. Of all the responses captured relating to frustrations in technology, comments regarding district or site mandates were among the most thoroughly explained responses recorded. Twelve passages were coded and identified as mandate-related issues stemming from the amount of technology-usage time imposed on students to the manner in which technology is to be used in the classroom. One participant stated:

> Another frustration I have is that at schools that have one-to-one access it seems that everything is on technology and there are no more books and real materials in use. I don't think technology should be used to that effect.

Similarly, others reported:

> Students do not all have the same technology education, so some understand technology more than others which can cause technology in the classroom to not run as expected.

Many primary teachers reported frustrations relating to lengthy username and password login requirements, forgetful students, and an imbalance of screen time and fine motor skills.

> In the lower to mid elementary grades, technology has not helped with the basics in learning to read and basic math skills. It makes assessing students more difficult. Many go on the computer to take tests, and the results are really not dependable. Did they guess, did they just click through to get done and move on to some other more fun tech thing? There is a place for tech in the primary classroom, but to use it for testing and activities that take away from the basic skills is a disservice to our students.

Another responded:

> There is such a push to use technology, but my students have such high levels of screen time they are coming into school with very weak fine motor skills (pencil grip, cutting, coloring) along with interpersonal skills.

Late adopter tendencies. The final subtheme of attitudes toward adoption involved tendencies of late adopters with 45 specific responses. Examples were coded to reflect the respondent's negative or limited thinking of technology, adoption, and its effectiveness in the learning environment.

> Online coding is not something an older teacher, such as myself, can easily figure out and competently teach since I have never been taught how to code or had experience with online coding platforms such as SCRATCH. There NEEDS to be more support for using technology in the classroom!

> I don't have any other resources available to support my technology use.

> There is NO human interaction when on a device.

> It ALWAYS seems to go out at inopportune times! Like every time I have an observation! It's also frequently changing so sometimes things get quickly outdated and we can't easily repair it in the classroom due to financial constraints.

Several respondents pointed out their dependence on others to support them in their understanding of how to use technology or problem-solve when issues arise. Some shared:

> Students know more about technology than I do. Colleagues might have more insight or know more than I do.
>
> The IT support I receive is valuable as I don't know the inner workings of the issues my computer may have, nor do I have the proper credentials to go further into the system.
>
> We are often given it to use with no training. We just have to figure it out ourselves.

When respondents were asked to identify effective ways to use technology or support/devices they would like in order to more efficiently integrate technology into their classroom, ten individuals stated, "Not sure." Furthermore, three offered the following as the most effective ways to use technology in the classroom: "...utilize an online reading comprehension program" and as "independent practice," while one individual requested:

> More ideas for technology with reading for higher leveled students. My higher students work at a much faster pace and I don't feel I know many apps and online programs to challenge them in reading.

Theme 2: Barriers/challenges to technology. Table 4 represents a deeper look into the types of barriers and challenges to technology experienced by the 172 participants revealed five subthemes and 220 coded passages: (a) budgetary constraints, (b) hardware/software issues, (c) infrastructure issues, (d) resistance, and (e) time. The most predominant areas associated with barriers and challenges were reported in the survey items concerning frustrations and technology integration while budget constraints, though frequently mentioned throughout the survey responses overall generated the least amount of coded passages in this theme.

Table 4

Barriers Thematic Findings (N = 220)

Theme	Subthemes	Technology Support (*n*)	Frustrations (*n*)	Tech Use & Effectiveness (*n*)	Technology Integration (*n*)
Barriers/ Challenges to Technology	Budgetary Constraints	0	13	0	8
	Hardware/Software Issues	0	37	0	20
	Infrastructure Issues	0	57	0	1
	Resistance	4	16	4	6
	Time	2	23	0	29

Budgetary constraints. Financial restrictions for purchasing new hardware for teachers and students, replacing outdated infrastructure, and renewing old subscriptions were commonly reported among the respondents.

There is not enough reliable technology due to funding.

It is often down because the district network and computers I use are 13 years old.

One respondent stated:

It's a bottomless money vault keeping up with technology; it's so expensive.

Hardware/software issues. This subtheme is the second most coded subtheme (*n* = 57) for this section with only one code less than *infrastructure issues*. Tied heavily to *frustrations with technology* from Theme 1, *hardware and software issues* were commonly related to outdated technology such as: laptops, desktops, document cameras, projectors, VDI's, interactive whiteboards, copy machines, and televisions. Additionally, respondents reported compatibility issues with software programs due to old hardware and stringent district protocols.

> It always seems to go out at the most inopportune times. It's also frequently changing so sometimes things get quickly outdated and we can't easily repair or replace it in the classroom.
>
> We need more technology available – we have plenty of wonderful programs but without the machines to run them.

With regards to outdated devices, one participant reported:

> My laptop is old and very glitchy. It doesn't have HDMI or USB so I have to run things through adapters which can cause technical issues.

Infrastructure/issues. With 58 passages coded as *infrastructure issues*, the most predominate subtheme of this theme, is also heavily tied to *frustrations with technology*. Infrastructure issues, namely internet (WiFi) connections, were reported by most participants as: "slow," "unreliable," "spotty," "easily freezes," and "horrible." Participants reported:

> I often lose connection or get blocked from some sites.
>
> Expecting so many people and students to use programs that then crash due to inadequate server capacity.
>
> Our system is overloaded and goes down often and without warning.

As a result of infrastructure issues, participants reported loss of instructional time, an increase in student behaviors, students missing out on instruction, and an inability to meet site technology expectations and differentiated instruction goals.

> The biggest struggle I have is when the internet is down, and the students are unable to access different sites needed for their learning.
>
> When it fails and students don't meet the required online time, it causes teachers to look bad by administration.

Resistance. In addition to the frustrations experienced when technology fails; participants also reported various levels of resistance due to fears associated with the learning curve, the belief of lacking successful technology integration skills, and apprehensions due to perceived

age-related limitations. Passages discussing hesitancy or refusal to integrate technology due to proper training were also coded as *resistance.*

> I don't know how to use technology and am required to use it daily.
>
> Most teachers don't use technology at all because there is a huge learning curve.
>
> Online coding is not something an older teacher, such as myself, can easily figure out and competently teach since I have never been taught how to code or had experience with online coding platforms.

When asked the most effective ways to use technology, more than a dozen participants reported: "Not sure," "I don't know," or "I struggle with answering this question daily;" resulting in comments such as:

> I use as little as possible.
>
> It takes more time to get it ready than to actually teach the lesson.

Furthermore, a few participants report a belief that technology takes away from important skills.

> Students don't learn things I consider valuable, like cursive, good penmanship, or addressing an envelope.

Time. Two of the survey items asked participants to reflect on what they believe were their biggest sources of frustration with using technology and what they need to more effectively integrate technology into their classrooms. Of the 220 coded responses within this theme, 54 were coded as *time*. Three of the 54 passages referred to time as the required number of minutes per day the students are to be engaged in online programs. More than 30 responses referred to time as the need for more time to engage in trainings.

> More hands-on trainings, and more time to dig into it. Our PD's seem to be rushed with more talking than doing.
>
> Time and more time to learn. A lot of programs are thrown at educators but little to no learning time is offered.

> I need more training and then time to play with different ways to use the technology in my daily lessons.

And more time to learn and explore new technologies.

> There is no time but our own time. This causes burnout. I went to a conference that was paid for by my district but was all day Saturday and Sunday. It was amazing but exhausting.
>
> I would like to get the technology and then time to explore, plan, and teach students how to use it.

Others requested more time in their daily schedules to teach their students about technology and how to correctly utilize it; including digital citizenship and etiquette. Additionally, the following participant echoed many of the frustrations experienced by participants.

> I don't have time to prepare all the equipment. Even when I prepared all my tablets last year, the district did not have proper security measures on the tablets. My students could access inappropriate content on YouTube. I could not trust them to use the tablets without constant monitoring. I do not have the time to learn the software of websites that are part of our curricula. We are not given time at school to explore anything new. We have to do everything on our own time.

Several participants referred to time as the time it takes students to log in, learn new programs, and access apps online.

> It takes a lot of time to have the kids learn complicated technology apps or websites.
>
> Having six-year olds type in a six-digit password for things can be overwhelming. Getting 24 students to log on to their one-to-one devices can be a lot of work to log on to one program.

Approximately eight of the responses included comments regarding the length of time it takes to deal with downed hardware or software and the effect it has on the timing of their lessons.

> When the network is slow or the Chromebooks are not working, it can take a lot longer than expected to do a lesson with students.

> When I'm using technology and it stops working in the middle of a lesson, the wait time is frustrating.

Frustrations with time spent double planning in anticipation for outages was also frequently reported among participants.

> When the lesson is planned with technology in mind and our WiFi shuts down; I feel like I'm wasting time if I double prepare for if I have technology or in case I don't.

Theme 3: Learning. Of the total 1,273 coded passages, this third theme generated the most codes (n = 381) of all five themes. This theme was generated primarily by subjects in response to the survey items about technology use and frustrations using technology in the classroom. Through the responses provided, five subthemes emerged as Table 5: (a) 21st Century digital learner, (b) academic learning needs, (c) examples of technology in the classroom, (d) student focus and retention, and (e) technology as a support.

Table 5

Learning Thematic Findings (N = 381)

Theme	Subthemes	Technology Support (n)	Frustrations (n)	Tech Use & Effectiveness (n)	Technology Integration. (n)
Learning	21st Century Digital Learner	0	2	0	0
	Academic Learning Needs	0	20	51	4
	Examples of Technology in the Classroom	20	22	100	105
	Student Focus and Retention	0	7	20	2
	Technology as a Supplement	0	3	25	2

21st century digital learner. The smallest subtheme of this section, *21st Century Digital Learner* generated only two coded passages. One passage referenced the perceived academic disparity between students who have and those who do not have access to technology on a regular basis. Additionally, one participant reported that technology usage in the lower to mid elementary grades does not help with acquiring basic reading and math skills.

Academic learning needs. This second most coded subtheme was discussed primarily in the survey item on technology use and effectiveness which resulted in 75 coded passages containing information on academic, social, emotional, and physical differences of students. Additionally, responses regarding students' various abilities, attitudes, desires, and motivations were also coded here. Forty-five percent of the participants reported student differentiation as the most effective way to utilize technology.

> Using online platforms allow for adaptive differentiation and information dissemination.

> I use a Promethean board and we show flipchart presentations that go with almost all of our lessons every day. This guides my instruction while giving students visuals. We make flipcharts that go with our curriculum showing directions, visuals, videos, and texts. This helps our visual learners and English Language Learners.

> Google Classroom is great, along with options to differentiate for various student needs.

Many commented on increased student engagement as a result of technology usage.

> I love it as a means of differentiation – to make instruction engaging and accessible for all students.

> I leverage digital tools to increase the Depth of Knowledge (DOK) of lessons and also student engagement. My students really enjoy Google Classroom, block coding, and various apps. We love to Green Screen in Kindergarten and use Flipgrid.

Others reported effective technology usage as the ability to increase opportunities of bringing realia into the classroom to support student learning and build on prior knowledge.

> In a Title I classroom where most students have limited background knowledge, providing photos and videos help reduce the gap in what's available to them.
>
> I like to give kids a visual representation of what they are learning.

Others believe technology usage is most effective when used in a variety of situations.

> The most effective ways to utilize technology are to design integrated technology projects that really challenge to critically think, collaborate with peers, engage creativity, and communicate with others.
>
> I use technology for student research, supplemental extensions to lessons, communication with parents and students, and for data collection.
>
> I like to use it as a way for students to respond to questions and stay engaged in lessons as done through Pear Deck. I like to use OneNote to organize and present lessons. I like to use game type sites like Kahoot and Gimkit to review information in a way that is fun and motivating for kids. I like the students to use it for their writing and presentations.

Two participants stated:

> Centers are a great time to use technology. It is great to use for practicing a concept, completing final projects, and learning to be good digital citizens.
>
> I love using gaming-type technology to supplement student learning directly on their level. I use programs like Lexia, Reflex, Prodigy, RAZ Kids, etc...

Examples of technology in the classroom. Participants were asked to reflect on the ways in which they utilize technology in the classroom; and emphasis on specific hardware and programs were encouraged. As a result, 245 passages were assigned to this subtheme. The most prevalent examples of hardware usage in the classroom were desktops, laptops (both teacher and student issued), document cameras (specifically Elmo's), and projectors (LCD). Participants reported a high level of dependence on using these items to deliver technology-based lessons and supports to their students.

> I love to use an Elmo to model annotating a text, to signal what page students should follow along with and show processes in math. I also love to use animated timers with visuals to help my students pace their independent and partner work.

Additionally, respondents reported relying on their SmartBoards, Promethean Boards, and interactive whiteboards for displaying information in large format to engage all learners. One participant equated the SmartBoard as "revolutionizing the classroom." Google Classroom was reported as the preferred online platform to deliver instruction, because it "allows for adaptive differentiation" and "information dissemination" through their applications like Slides, Docs, Forms, Sheets, and Sites. Additionally, participants commented on Google Classroom's compatibility integrations for third party programs like Benchmark, iReady, and Khan Academy as well as the file organizational features of Google Drive.

> I love using Google Classroom to teach writing. I can keep tabs on everyone's documents easily. I can leave comments daily at home or at school. I see their edit history; students can peer review and edit. Students can highlight changes in different colors to see revision skills. I also use Google Forms to give feedback on lessons and student progress which helps for conference planning.

> I prefer utilizing programs that allow students to work at their own level and sharing resources for assignments through Google Classroom, which allows the teacher to get a good handle on where students have strengths and weaknesses.

Several participants referred to Freckle as another online platform that allows for differentiation and supplemental resources. The common belief among most participants is that "technology can be used to individualize education and also motivate." A variety of programs and applications were reported as being utilized in the classroom on a regular basis.

> I use programs such as Nearpod where I can make teaching more interactive and fun.

> I love using gaming technology to supplement student learning directly on their level. I use programs like Lexia, Reflex, Prodigy, and RAZ Kids.

> I use individual learning programs such as Amplify, Mathshelf, and English in a Flash.

> I use timed PowerPoints with sounds, so kids know when to transition from one station to another, they just look at the board and know where to go.

Leveraging programs to support differentiation for student success was a common view discussed by several of the participants.

> For example, instead of writing spelling words three times they can practice spelling skills on SpellingCity.
>
> Exceptional learners can work independently while I work with others that need more support. I can use assistive technology like Google Read and Write since it gives me immediate access to data and the kids are way more engaged in learning.
>
> I like to use technology for projects that incorporate writing and photos/drawings for my kids, like KidPix.

Additionally, several respondents spoke to the importance of involving parents in the learning process by using parent communication platforms like ClassDojo and Remind; but also, programs that offer parental access, like SeeSaw.

> SeeSaw connects parents to their child's classroom activities.
>
> I have found SeeSaw to be life changing in my kindergarten class. I use it to differentiate assignment, as *second change learning* to reteach. It's a game changer for parent communication. Parents can view and comment on work. My students can send a message or video to their parents or me to communicate their feelings and struggles.
>
> One of my favorite resources is SeeSaw. Students can use it to share their work with their families providing them an authentic audience. They can show their thinking and learning and reflect on it. It provides engagement as well.

YouTube videos were referenced numerous times as the favored method of enhancing the learning experience.

> I use short videos that add to a lesson, like videos about the frog cycle when teaching about frogs.
>
> I use videos to grab students' attention and use it to Skype with scientists in Antarctica and watching San Diego Zoo Live; things like that.
>
> I do everything from video clips, virtual field trips, Ted Talks, etc...

When asked to provide feedback as to what devices or programs are currently on their wish lists; participants responded mostly with requests for one-to-one devices (either Apple or HP), adaptive programs for their special needs' students, updated equipment and WiFi infrastructure, and more technology-based curriculum. In rare instances, participants requested a large wall-mounted screen as opposed to their current pull-down screen, a computer-on-wheels (COW) for mobile technology use, and updated document cameras.

Student focus and retention. Many participants reported the need to maintain balance when integrating technology to foster student engagement while delivering purposeful, targeted instruction addressing the various academic needs of their learners.

> I use technology consistently, in small snippets to heighten engagement in content presentation.
>
> Technology can be used to individualize education and also to motivate. I use programs such as Nearpod where I can make teaching more interactive and fun. The goal is to use it to assist good teaching, not use it to replace teaching.

Moreover, participants also noted a relationship between leveraging technology and an increase in student focus and retention.

> The kids are captivated by it [technology] and it surrounds them in their daily lives, so they feel like it's talking their 'language.' So, using videos, online tutorials like Khan Academy, the document camera, and the SmartBoard are almost guaranteed to get the kids sitting up and paying closer attention.
>
> Research supports games as being the easiest way to cement learning because it takes less time and fewer 'at bats' to create a new synapse in the brain.

Technology as a supplement. Most participants believe that technology should be used as a supplement to "assist" in the learning experience rather than as a replacement for "good teaching" or be utilized as the primary method of delivering instruction.

> I believe there is a place for technology in the primary classroom, but to use it for testing and activities that take away from the basic skills is a disservice to our students. Research shows that our students are not doing better in reading and writing with the implementation of technology. That's really important research when making Education policy decisions.
>
> Another frustration that I have is that at schools that have one-to-one access it seems that EVERYTHING is on technology and there is no more books and real materials in use. I don't think technology should be used to that effect.

Additionally, several participants reported the benefits of assigning supplemental work on computers during small group time to help address the academic learning needs of their students.

> I use student interactive activities like boards with images to manipulate and student computers with reading or math programs tailored to the student's individual needs. These are used as supplements when I'm doing small group lessons.
>
> I prefer using technology in a variety of ways to differentiate learning and support small groups as well as individual needs.

Theme 4: Supports. A deeper look into the types of supports to technology experienced by the 172 participants revealed four subthemes (n = 281) as depicted in Table 6: (a) administrative support, (b) professional development, (c) self-help, and (d) support network. One hundred and forty-one instances accounted for identifying the participants' support networks.

Table 6

Supports Thematic Findings (N = 281)

Theme	Subthemes	Technology Support (n)	Frustrations (n)	Tech Use & Effectiveness (n)	Technology Integration (n)
Supports	Administrative Supports	0	10	0	5
	Professional Development	4	14	2	67
	Self-Help	33	1	4	0
	Support Network	89	9	1	42

Administrative supports. Participants were asked to reflect on their site-based technological experiences and supports and identify areas of need they felt would be beneficial in helping to better integrate technology into their classrooms. As a result, 15 passages were identified as relating to administrative support. Most participants reported feeling that their administration directly blames them when technology fails in the classroom.

> When you plan a lesson using your [interactive] board and for some reason the connection is not working. The lesson can't be done. You are standing in front of 25 seven-year olds in limbo. Panicking. Your boss tells you [that] you have to stay on pace and now you are behind.
>
> When it fails and students don't meet required online time it causes teachers to look bad by administration.

Others felt as though their administration does not always embrace technology, and in some cases, prohibits the use of it in the classrooms. Ten of the 15 respondents stated they feel it is the responsibility of their administration to provide one-to-one devices and better WiFi connectivity in the classroom given the expectation to incorporate more technology into their daily lessons. Similarly, two respondents believe administrators should also be responsible for ensuring that educational technology specialists remain active positions at their school sites.

Professional development. Participants were asked to recall professional development experiences they received both at their school sites and their districts. This subtheme generated the second highest total of coded passages in this theme (n = 87). Overall, most participants expressed the desire to incorporate more technology into their teaching repertoire but shared concerns with a general lack of adequate training and support.

> Literally feeling at a loss with no one around to help, especially when there is a due date and no training. Taking the time to figure these things out on my own is very time consuming; or when new technology is just dropped off with no explanations.

> A lot of programs are 'thrown' at educators with little to no training.

Another offered a suggestion for the type of professional development needed.

> The district needs to provide professional development for teachers to be aware of programs the district purchased and how to use them. On-site support to show teachers how technology can enhance learning in all subjects and for all learners.

Requests were made for more technology personnel support for trainings, general IT related supports, and troubleshooting when needed; especially during lessons.

> I would ask for more suggestions on how to use technology in the classroom, especially in ways that allow the students to use the technology themselves as a tool for discovery.

> I would ask for in-service classes that would expose me to all the ways to utilize my computer most efficiently.

Additionally, most participants were open to improving their current technology implementation methods, indicating a desire for self-improvement and a recognition of the importance of providing a technology-rich learning environment for their students.

> I want an educational technology expert to come in, observe my teaching for a full day, and then provide feedback and suggestions for where I can improve based on my current level of technology usage.

Self-help. The subtheme of *self-help* came about as a result of participants articulating their preferences with researching, learning, and troubleshooting technology-related issues. Of the 38 passages generated in this subtheme, all respondents expressed strong desires to troubleshoot and research themselves prior to activating their support networks. Some felt they can solve problems quicker on their own, some expressed an excitement with learning and discovering on their own, and others reported frustrations with the length of time it took for IT to respond to their requests.

> Sometimes just trying to figure it out myself or asking someone nearby produces the most effective results and the fastest.

> Individual troubleshooting helps me understand how and why certain programs or machines work.
>
> I tend to use online searching to fix my technical issues because I can understand the basics of what I am using, and it tends to be quicker than waiting for Sysop [IT] to come and assist with my issues.

All participants reported seeking answers online via Google searches, YouTube tutorials, and social media groups.

> When trying to figure out new technology or troubleshoot, I use online resources. I Google issues, often find YouTube videos, or join Facebook groups where other teachers provide support. I find these resources to be the most valuable.

Support network. The most predominate subtheme of this section, *support network* generated 141 coded passages. One survey item asked the participants to identify individuals or groups of individuals they turn to when seeking technology support. Participants identified on-site and district technology personnel, teachers on special assignment, colleagues, members of social media groups, students, and themselves as comprising their support networks. Overall, participants reported positive interactions with their support networks only expressing frustration when support was not received in a timely manner and negatively impacted their instruction. Participants indicated colleagues, students, and themselves as being the most utilized members of their support networks given their proximity, shared interests, and high response rates. Help desk/IT personnel were reported as being highly useful though several expressed frustrations/apprehensions with utilizing them due to long response rates, low-priority technology issues, and tightly packed IT schedules. Teachers on special assignments was the least reported support network members. While many of the respondents reported value in problem solving themselves first, they do understand the importance of establishing a network of trusted individuals to support them when necessary.

> I troubleshoot problems I have with technology and am often successful; however, when I cannot figure out the problem, it is nice to have other experts or problem solvers who can troubleshoot with me, so together we can make it happen.

Participants reported seeking support from their colleagues prior to submitting IT tickets or reaching out to other members of their support networks.

> I learn so much from my peers. They are most willing because we have a personal relationship and hopefully feel I can help them in other ways. I often feel stressed and not sure who to go to when I experience technology issues. I pride myself on being independent so having to rely on someone else is challenging but necessary to do my job.

> I go to my colleagues first because they are using the same equipment as me and often run into similar problems, this usually leads to quicker solutions than calling the IT or the help desk.

> We constantly ask each other questions when it comes to technology and if there are problems. Most of the time it is a lot faster to ask a colleague than wait for an email from an IT coordinator.

Some sought out the support of their technologically savvy students.

> Students know more about technology than I do.

> My students often have siblings and have picked up new tools or tricks to also teach me!

> Students are super valuable to me because they are with me all day and I can rely on them if I'm 'stuck' with something. We are always there for each other no matter what.

Technology specialists or personnel were reported as being valuable in that they often have more experience in troubleshooting hardware related issues.

> Help desk/IT support people are important when there is a problem, I need someone to call who understands how to fix the problem.

> They are easily accessible, and the response is which, which is best.

> The most valuable is having a technology assistant whose only job is to assist with technology issues. Having a Digital Learning Coach or a teacher on special assignment to help teach many of the newly required technology requirements is a must.

> The IT support I receive is valuable as I don't know the inner workings of the issues my computer may have, nor do I have the proper credentials to go further into the system.

When asked what would be most beneficial to teachers in implementing technology, aside from one-to-one devices, full-time on-site technology support personnel was reported as the second highest most rated item.

> A full-time technology coach at our school who can help us integrate the new technology and figure out for us what works and does not work. This would save time and increase teaching time.

Theme 5: Technology integration. During the qualitative online survey, the 172 participants were asked to reflect on their current and past experiences with technology integration in their classrooms. Table 7 represents the four subthemes that were generated from the 186 coded passages: (a) evolution of technology, (b) impact of technology on students, (c) leveraging technology, and (d) technology in planning.

Table 7

Technology Integration Thematic Findings (N = 137)

Theme	Subthemes	Technology Support (*n*)	Frustrations (*n*)	Tech Use & Effectiveness (*n*)	Technology Integration (*n*)
Technology Integration	Evolution of Technology	0	1	0	4
	Impact of Technology on Students	0	15	14	10
	Leveraging Technology	0	9	28	16
	Technology in Planning	1	18	8	13

Evolution of technology. The least coded subtheme of this theme; *evolution of technology* generated five coded passages which are mostly located in the survey items

relating to technology integration. The following statement includes components of all five passages.

> My newly adopted curriculum has a technology piece which I find to be clunky and awkward. It's neither intuitive nor is it sensibly organized. The improvements are less useful and functional than in previous versions, leading me to suspect a rush to market before adequate input was received from end users. This causes unnecessary stress and frustration for both teachers and students. Sometimes the rush to adopt a fix for something we have been trained to use and possible later success is greatly hampered by a lack of planning and/or adequate training.

Impact of technology on students. When reviewing responses from the four qualitative survey items, 39 passages were coded to highlight the impact technology had on the participants' students. While several subjects reported technology integration to be more of an impactful experience on students who are at or above grade level; many expressed concerns with technology not being appropriate for younger students nor adequately meeting the needs of below grade level students.

> My learners who require the most support and growth to get on grade level do not respond to technology the same way my more accomplished learners do. They need more adult expertise time, not computer adapted programs that expect kids to learn on their own with a computer program.

> In the lower elementary grades, technology has not helped with the basics of learning. It also makes assessing students more difficult. Many go on the computers to take tests, but did they guess, did they just click through to get done and move on to something else?

Others expressed concern with the ratio of on- versus off-device time.

> In our district the demands and number of minutes that are imposed on us to use technology with my kindergarteners is overwhelming. I believe that technology should be scaled back for kindergarteners and first graders.

> My district has a mandatory usage time for certain apps. I feel I end up plugging my kids in to the apps for a good chunk of the day and then they go home and do the same thing. They spend more time on their tablets than talking to each other.

Leveraging technology. The most predominant subtheme, *leveraging technology* was assigned 53 times throughout four qualitative survey items. Passages describing the benefits of leveraging technology to engage students in the learning experience with some reference to specific examples of hardware and software were assigned to this subtheme. Many respondents shared common responses.

> The most effective ways are to design integrated tech projects that really challenge students to critically think, collaborate with peers, engage creatively, and communicate using technology.
>
> Technology can be used to enhance lessons and support student learning.
>
> To grab students' attention and use it to enhance the lessons I am already teaching to meet standards. Giving students the hands-on practice or taking them places without having to leave school gives my students experiences they might not have otherwise.

Some reported examples of leveraging technology to enhance student learning are below.

> I have a Promethean Board that we use for all the lessons. I use timed PowerPoints with sounds, so kids know when to transition from one station to another; they just look at the board and know where to go.
>
> I love to use an Elmo to model annotating a text, signal what page students should follow along with, and show processes in math. I love to use animated timers with visuals to help my students pace their independent and partner work. Allowing students to have the option to type or hand write motivates them and allows them to produce better work.

One participant explained the benefits of collaborating with other classes using technology.

> I use technology to show my students enriching materials on topics they are learning about. Our charter is very tech rich and we use technology to collaborate with other classrooms at other campuses to have more input on a topic.

Several others described the outcomes associated with leveraging technology in their classroom to allow for student more autonomy.

> I love it as a means of differentiation. I try to make instruction engaging and accessible for all my students.

Using technology allows students to show their learning in their own way.

My students use it every day, it helps them learn from their mistakes.

I use it to teach a lesson then allow my students to use technology to enhance their understanding of that lesson.

Technology in planning. Within the survey items, participants were asked to share their experiences with using technology in the classroom. From the 172 responses provided, 40 participants cited utilizing technology in their lesson planning as well as incorporating technology-based activities in their daily schedule to drive standards-based instruction. However, most of the 40 coded passages were simultaneously coded as *frustrations with technology* due to educators being unable to deliver lessons as intended as a result of hardware and programs not working. Most expressed a desire to provide their students with more technology-rich lessons if provided with reliable devices, infrastructure, and sufficient time to properly plan.

Phase Two Interview Findings

Eight individuals that participated in the survey agreed to interviews during December 2019. Interviews focused on a deeper look into successes and challenges for infusing technology into their teaching repertoire as well as further discussions of their technology support network. For discussion, each individual was given a pseudonym.

Demographics. Of the eight respondents, one stated that they are 30 years of age or younger. Three stated that they are between the ages of 31 to 45 years of age. The remaining four participants stated that they are older than 45 years of age. Most fell within the 45 years and older age range which is the same as seen with the Phase One online survey sample. Two of the respondents reported teaching 1 to 5 years, one 6 to 10 years, and another 11 to 15 years. The

remaining three reported having taught between 16 to 20 years; one declined to state. Current teaching assignments were reported as follows: one reported teaching second grade, three teach fourth grade, two teach fifth grade, and two teach sixth grade.

Phase Two Thematic Findings

Transcripts of the 14 interview questions were analyzed using the same thematic structure as was used for the open-ended items of the survey in Phase One resulting in a total of 1,032 coded passages. The five themes and subthemes are represented below in their respective tables with inclusion of respondent quotes. The codebook including definitions of each theme and subtheme is located in Appendix F.

Theme 1: Attitudes toward adoption. Through the deeper dive into their technology integration experiences, Table 8 displays four subthemes regarding their attitudes, habits, and tendencies on adopting technology which were evident within the 211 coded passages.

Table 8

Attitudes Toward Adoption Thematic Findings (N = 211)

Theme	Subthemes	Anne (*n*)	Dorothy (*n*)	Emma (*n*)	Grace (*n*)	Jean (*n*)	Maria (*n*)	Sam (*n*)	Whitney (*n*)
Attitudes Toward Adoption	Balance	2	1	4	0	0	2	7	0
	Early Adopter Tendencies	14	8	0	12	0	6	6	8
	Frustrations with Technology	9	12	11	16	5	13	24	7
	Late Adopter Tendencies	12	9	0	10	1	7	1	4

Balance. When asked to share whether they believed technology should be mandatory in the classroom setting, four of the eight respondents expressed a necessity in maintaining balance between a technology-rich learning environment and a more traditional one. The respondent with the most references to *balance* ($n = 7$) stated:

> I think there should be a really good balance because we are moving to an age where technology is playing a big effect in careers...there should be technology in the classrooms. I just don't think it needs to be at every point of your day. (Sam)

Additionally, respondents expressed a strong need to maintain a balance between work expectations and home life. The following individual referenced working in the classroom during a holiday break and sums up the feelings of most of the respondents.

> I would say the last couple of years I stopped going in so much. I had to realize that the time out of the classroom needs to be out of the classroom. I don't mean to sound cliché, but I need to take care of me. (Emma)

Emma further explained that at certain school sites teachers:

> ...tend to spend more time being invested in the classroom than in ourselves or outside of the classroom, which is frustrating. There are a lot of expectations that are placed on teachers and as much as I want to have balance, I still have these expectations held over my head.

Early adopter tendencies. Most of the interview respondents shared common early adopter tendencies, such as being self-motivated, hands-on learners, open minded, and regarded as being technology experts by their colleagues. Responses such as the following are indicative of confident technology-users.

> I knew from the mistakes in the past that if I introduce anything slowly, I had to introduce the technology first, and let them play around with it. I am an anomaly. (Anne)

> I really have always been very much somebody who enjoys being on the cutting edge with technology. I feel like it streamlines what I have to do so I actually have more time to really devote to planning. (Dorothy)

Frustrations with technology. The most predominate subtheme was *frustrations with technology* with a total of 97 codes assigned throughout all eight of the respondents. A majority of the respondents' frustrations with technology were centered on device or infrastructure related issues, however, several underlying threads were identified and categorized in the following manner: (a) device/infrastructure issues, (b) lack of support, (c) district restrictions, and (d) teacher apprehensions.

Issues involving outdated or broken devices and internet connectivity were the most reported participant frustrations. Most participants expressed frustrations with having limited access to one-to-one devices. While others mentioned annoyances with reliability spending long hours at home or work creating technology-rich lessons only to have the technology give out at the most inopportune time.

> I had this great PowerPoint and my visualizer was working all day and that evening was parent teacher information night and that's when it decided to not work. (Emma)

> We're running Windows 7, so that was frustrating because we had lag in things. (Whitney)

Several of the participants expressed frustrations with having to share one-to-one devices with other classes or grade levels preventing them from regularly incorporating technology-based activities into their lessons. One described only having access to laptops once every two weeks.

> I mean it's a lot of screen time, but I just want to put so much in because we only have that one day [where] I can work with everybody. (Anne)

All eight respondents reported feeling frustrated with the lack of support from district and site IT personnel for technology-related issues while others described their frustrations with not receiving adequate training on programs.

> They don't teach you how, they don't tell you the structure of how you're supposed to teach it. (Grace)

With regards to attending district trainings, one participant stated:

> We get pulled constantly for trainings, non-tech related issues, or meetings...it makes it hard to kind of justify being out yet again for something else, even if it's something that we want to go to. (Sam)

District restrictions on teacher and student accessibility to programs while at school and at home are among the most reported complaints from the respondents. Participants also reported some discrepancy between the level of restrictions placed on teacher access versus student access. Others reported frustrations with working at home on personal devices and internet.

> I find it hard when I'm at home. When I'm at school it's easier because I'm there on the intranet so I can access everything. It's when I'm at home and I'm trying to access things that I find it difficult. I get blocked sometimes. I get a lot of access denied. (Sam)

Five of the respondents expressed apprehensions as a result of their colleagues' refusal to use certain online programs due to the learning curve or a lack of confidence in their students' ability to utilize technology in the manner expected of them. Reponses such as the following were frequently reported as the reasons why technology is not more readily used.

> It's still kind of new having multiple computers in my classroom, so my ability to use them is limited. (Emma)

> I know that some of the other teachers are like really scared of it [robotics] and really nervous. (Anne)

One participant expressed frustration with the level of skills the students are entering the classroom with as affected by their socio-economic backgrounds or prior family experiences. While another commented on the lack of interpersonal communication due to computers being mostly one-to-one with little direct communication due to being primarily used "for playing games or watching tv."

Late adopter tendencies. Coding the 44 passages revealed common late adopter tendencies among individuals, such as limited thinking in oneself and others and resistance to change. Limited thinking in others, especially regarding the age of colleagues and students, was the most heavily coded tendency.

> We have a lot of veteran teachers that have been teaching for 30 years or more and a lot of them are not on board at all with technology. (Dorothy)

> That can be scary for older teachers because I see how they can struggle with technology because they're set in their ways and whatnot. (Maria)

Theme 2: Barriers/challenges to technology. A more in-depth look into the types of barriers and challenges to technology experienced by the participants revealed five subthemes regarding barriers and challenges to adopting technology within the subthemes of (a) budgetary constraints, (b) hardware/software issues, (c) infrastructure issues, (d) resistance, and (e) time resulting in 89 coded passages, as depicted in Table 9 below.

Table 9

Barriers/Challenges to Technology (N = 89)

Theme	Subthemes	Anne (*n*)	Dorothy (*n*)	Emma (*n*)	Grace (*n*)	Jean (*n*)	Maria (*n*)	Sam (*n*)	Whitney (*n*)
Barriers/ Challenges to Technology	Budgetary Constraints	0	1	0	0	1	2	1	0
	Hardware/ Software Issues	3	4	7	6	1	7	8	4
	Infrastructure Issues	1	0	0	0	2	5	4	1
	Resistance	5	3	0	1	0	5	3	4
	Time	2	3	0	3	1	1	0	0

Budgetary constraints. Financial restrictions for purchasing online subscriptions or devices for students was commonly reported among the respondents.

> Unless we pick up the expense ourselves, which I have one several things and pay the subscription myself in order to be able to continue using it, it doesn't happen. I would love to have the availability of funding for that kind of stuff. Also, unless I go out and look for a grant myself...it's not going to happen. It's not a priority for the districts, especially the smaller districts like ours. Our area is a very high poverty area, so we don't have the tax revenue. (Dorothy)

Hardware/software issues. This subtheme is heavily tied to the *frustrations with technology* subtheme from Theme 1 and generated 40 coded passages. Additional issues were also attributed to workroom copy machines. Several of the respondents expressed issues relating to copy machines regularly breaking down, restrictions on clicks[11] limiting their usage, or only having one copy machine servicing the entire school. Additionally, VDI's, projectors, interactive whiteboards, and other hardware issues were among responses coded for this subtheme.

Infrastructure issues. Another subtheme tied to *frustrations with technology* from Theme 1, *infrastructure issues* were typically dual coded as frustrations. However, additional issues became evident when addressing the district as an entity. Two participants reflected:

> I felt like I went back to the dinosaur ages and now as we continue to grow, I still don't think we're in the same spot that we were 16 years ago in my old district. (Jean)

> I mean honestly, for the district that I work in, I would have figured that it would be more advanced than where I was coming from because I'm from a bad neighborhood. I guess it's in my head, I'm going to another district and it's going to be even better. And I was greatly disappointed. It has to start with the network. The district has to be able to have the capacity to hold all those computers in one school. (Maria)

Resistance. Participants reported higher levels of resistance when administration mandates implementation of a new technology or curriculum resulting in teachers feeling loss of

[11] Some teachers (depending on location, regulations, and school/district budget) are given a pre-determined number of copies (or clicks) per year and are not replenished until the following school year.

autonomy over their classrooms and an expectation to "throw away all the materials they have created for years." Furthermore, participants recounted instances where their co-workers felt resentment by "being forced to do one more thing," a general sense of their voices not being heard, and resistance among older teachers who "get very set in their ways very quickly."

Time. Four respondents expressed difficulty in finding sufficient time to manage technology-related issues themselves; as they disrupt the flow of the lesson and impact student retention and focus. Most participants reported not having sufficient time to integrate technology due to the limited availability of devices and tight schedules with little wiggle room.

Theme 3: Learning. This theme is comprised primarily of responses to interview questions about utilizing technology while teaching and the impact that technology has on student learning. Five subthemes were evident within the 350 coded passages (see Table 10).

Table 10

Learning Thematic Findings (N = 350)

Theme	Subthemes	Anne (*n*)	Dorothy (*n*)	Emma (*n*)	Grace (*n*)	Jean (*n*)	Maria (*n*)	Sam (*n*)	Whitney (*n*)
Learning	21st Century Digital Learner	0	2	0	3	4	4	5	1
	Academic Learning Needs	12	4	12	23	7	16	19	7
	Examples of Technology in the Classroom	24	31	4	26	9	13	17	13
	Student Focus and Retention	2	6	11	20	8	10	15	7
	Technology as a Supplement	0	6	0	2	1	3	2	1

21st century digital learner. When asked what it means to be a 21st Century digital learner, participants reported various skills and strategies that students must possess in order to succeed in a digitally expansive society.

> Students need to know how to use a device and how to use it responsibly and safely. They also need to understand digital citizenship. They need to understand how to use technology in a responsible manner and not just for fun. (Whitney)

> You're going to be using 21st Century standards teaching the students to have computer literacy, how to be able to use those skills, how to access their documents, using the blending learning model, and teaching researching skills. (Grace)

> It's not just knowing technology but how to be responsible with it. It's understanding the rules and etiquette of it too. (Sam)

One participant believes that teaching others is an important skill of digital learners.

> As an adult and even as students, what we can share and teach other people about what we are learning is part of the learning process too; to be able to turn around and teach someone else. (Dorothy)

When reflecting on the responsibilities as educators to effectively instruct 21st Century digital learners, participants stated:

> A lot of things we are now requiring students to do are for jobs that have not yet been created in math, science, technology, and engineering. There are jobs opening up right now that we don't even know are coming; and we don't know the skills they're going to need for them. So, it's our job to try and catch them up, show them how to use things correctly, and have them really think critically and collaboratively. (Sam)

> There is a huge movement for getting students college and career ready. We live in a technology-advanced society where we're not using dictionaries and we're not handwriting papers anymore. (Grace)

Academic learning needs. As the second most coded subtheme (n = 100), passages coded as *academic learning needs* focused primarily on responses discussing the learning needs of students in the participants' current and previous classes. Participants reported leveraging technology to support students in addressing and minimizing achievement gaps. All eight

participants commented on the deficits they see in their students and provided ways in which they support their students in their academic and socio-emotional growth.

> I have a lot of students with dyslexia. I use Flipgrid to help them read their own writing. So even if it's hard to read, they're still able to have a voice. Those who are really shy won't get choked up because they can redo the video if they don't like it. It's all on their terms. (Anne)

Anne goes on to explain:

> I have a student who does not write at all. And so, I use Google Read and Write as a way that he can do his writing because he's able to speak, technology allows some of these kids [the ability] to produce work on their own without me being there or an aid.

Another reported a high ratio of special needs students.

> I have two students with IEP's and two who are on SST's. I have three gifted students. Many of my students do not have concrete knowledge, some are still struggling to add mentally. (Grace)

While another participant discussed the difficulties associated with teaching a classroom comprised of half GATE students and half General Education[12] students.

> Half of the students struggle, especially when it comes to depth, complexity, and acceleration. So, while my gift students are able to perform at high academic levels, I find they are sitting there waiting to move on because I have another half of the class who is not understanding whatever I'm teaching. I struggle to keep them from getting bored, especially since they are in my class specifically to be challenged at their level. It's difficult to do what when a good half of the class is just not ready for it. (Emma)

Examples of technology in the classroom. During the interview, participants were asked to comment on the types of technology devices, software, and strategies they use in their classrooms. One hundred and thirty-seven passages outlining specific examples were generated. The most prevalent example of technology use in the classroom was Google Classroom with seven participants reporting some level of implementation of the Google Suite application.

[12] Also referred to as Regular Education

> I've set up a Google Classroom but it's very limited. I only know how to put homework on there. (Emma)

> I guess the one thing I use consistently right now is Google Classroom. If there's a new read aloud book, I'll put the trailer to the book on there and have them vote. (Grace)

> In my old district I used Google Classroom a lot with my sixth graders. It was beautiful because sometimes you just tell them to type something to show me or compare things, and they can do it really fast. (Maria)

Although all participants stated some level of access to one-to-one technology at their school sites, only Whitney reported being fully one-to-one at her school site.

> We are not one-to-one right now, but I do have ten Chromebooks, if they're working, for a classroom of 25 kids. (Anne)

> The laptop cart for our grade level is housed is one classroom and then each teacher has to go pick up the laptops and take them to their room, we have to rotate between six classrooms. (Sam)

Grace was the only participant that reported having access to iPads with several apps on a regular basis. However, Dorothy mentioned:

> All the teachers have an iPad available for their use and have been offered iPads for their class. One of the reasons that I have as many as I do, even though I still don't have enough for every student, is because the teachers don't want them. So, I take them.

Others cited interactive whiteboards, Mimios, and Elmo document cameras as being widely used in the classroom to deliver technology-supported instruction.

> Our Mimio makes the whiteboard into a SmartBoard. It's an instrument that you can use for your computer in which you can interact with whatever you're projecting. (Sam)

> I have an interactive whiteboard, unfortunately it is not working because the software is not updated enough to be able to run on my computer. Also, all classrooms have projectors and document cameras. (Dorothy)

All participants reported a high rate of implementation of programs to engage students and enhance standards-based learning. Anne reported using Flipgrid as a means to cement learning

and provide students with the opportunity to present in class reducing anxiety for some of her students. She goes on to explain leveraging big buddies who facilitate the teaching of certain technology-based programs to her second graders allows her the freedom to focus on teaching content. Others reported implementing a variety of programs to support their students.

> I use SeeSaw and have my students upload stuff to their learning journal so parents can be a part of what they're doing. (Dorothy)

Both Jean and Maria expressed a preference toward using Excel in the classroom due to the graphs and tables feature. While others mentioned incorporating PowerPoints into assignments has allowed students to produce quality work in a new and inventive manner. A few participants mentioned utilizing the Clever Portal where students access programs.

> We have a Clever Portal which is a single sign-on housing base for all our programs. We have Benchmark, Zearn, MobyMax, Study Island, Google Classroom, and Galileo ATI for testing. (Grace)

Other programs such as: BrainPop, Istation, iReady, Prodigy, Tinkercard, Mystery Science, Prodigy, Who's Reading, and Google Read and Write, were among the various programs mentioned by participants. Videos and Pixar shorts were commonly referred to as a means of supporting learning in the classroom.

> I'll put on a Disney video and remind them that I already taught the hyperbole lesson. There are clips of Walt Disney movies and when I play those the kids say, 'we never paid attention to them and they're hyperboles!' (Maria)

> If you can put a video clip in and they can actually see a giraffe's tongue or something like that it makes it a totally different [experience]. (Dorothy)

One participant reported a school-wide implementation of a robotics program and 3D printers.

> All grade levels do robotics. In second grade we introduce them to robotics. So, it's an interesting perspective working with second graders on coding, programming, and building. I am one of the few teachers at school who know how to use the 3D printer. The

> downside is that it takes forever to print anything, especially when I have 25 kids who want to print. (Anne)

Student focus and retention. Of the 79 coded passages for this subtheme, approximately 40% discussed increases in socio-emotional issues, negative behaviors, and a general lack of focus and retention.

> The dynamics of students are changing. We're noticing an overall different characterization of students, lack of motivation, lack of caring. (Grace)

> I've noticed their behavior is really, really bad. They mess around, don't listen to the person that's teaching. And then the moment you put on a video everything is quiet. (Maria)

Several participants attribute the increased negative behaviors and lack of motivation due to the onset of technology.

> There are these behaviors and stuff I've noticed in kids where I haven't noticed in previous years when they had less technology. It's surprising to see how much it affects kids, what they view and what parents aren't realizing what they're seeing because they think it's just a children's show. (Sam)

> It's really interesting to see the differences between kids on technology and kids off of technology and how that's changed over the years. (Maria)

All participants reported observing an overall decrease in student retention in the past few years.

> I can teach something in depth the day before and then I expect them to a least remember something the next day and it's like they don't know. (Maria)

> Oh, my goodness. Last year's students seemed to know what respect was and this group has never really been held accountable as far as getting work done and being accountable for their own learning. It's been a struggle this year. (Whitney)

> I don't have shining lights or blinking lights in front of me. It's just me. I feel like I have to sing and dance to maintain their attention. I also think it has limited their ability to communicate. (Emma)

Technology as a supplement. Participants were asked to discuss ways in which they currently incorporate technology in their classrooms resulting in 15 coded passages. Two

participants reported a preference for utilizing technology as a supplement to regular classroom instruction. Google Classroom was cited as a platform in which lessons can be taught whole class followed by independent and group work assigned to enhance the learning experience or provide additional opportunities for remediation. Grace commented on the importance of leveraging technology as a writing tool, so students understand "there is a difference in formal writing and informal because they are so used to texting."

Theme 4: Supports. Six interview questions asked interviewees to reflect on their experiences with receiving assistance with technology from their support network. Furthermore, respondents were asked to discuss their preferred method/s of engaging in professional development. As a result, Table 11 presents the four subthemes that were evident in the 196 coded passages.

Table 11

Supports Thematic Findings (N = 196)

Theme	Subthemes	Anne (*n*)	Dorothy (*n*)	Emma (*n*)	Grace (*n*)	Jean (*n*)	Maria (*n*)	Sam (*n*)	Whitney (*n*)
Supports	Administrative Support	0	3	3	6	4	13	7	3
	Professional Development	5	9	7	13	1	3	18	6
	Self-Help	8	9	1	8	3	2	7	4
	Support Network	5	7	2	10	8	4	12	5

Administrative supports. Thirty-nine passages became evident as participants reflected on their experiences with receiving support at their school sites. Two of the respondents reported

feeling supported by their administration when seeking to purchase devices and experiment with new programs. One stated:

> We have a new principal at our school; he's from a larger district. I feel like he is more supportive because he's the only one actually pushing to get Chromebooks and technology into the hands of the kids...I like being able to have the freedom to be able to find something that works for my students and for my teaching style. (Dorothy)

Several other participants reported the opposite level of support from their administration.

> There are a lot of expectations that are placed on teachers at my school. My friends who are in the profession as well are surprised at the different types of expectations that are put on me and my colleagues. (Emma)

Most participants reported a lack of support in receiving training and planning opportunities with their colleagues. Additionally, five subjects reported feeling unsupported by administration with student behaviors, advanced degree pursuits, and technology integration.

Professional development. Participants were asked to reflect on both their experiences with receiving professional development at their school sites and districts as well as describe their preferred method/s of engaging in professional development resulting in 62 coded passages. Mixed responses were noted when coding passages on school site and district provided professional development trainings. Most of the respondents expressed repeatedly receiving sub-par professional development (PD).

> I was very disappointed coming to this district. As a new teacher you would expect that they had a website or some kind of new teacher training course, but they didn't. I feel like we have PD's for the wrong things. Sometimes I don't need to hear this; and you just wasted my time where I could have been learning something that is current or has to do with us. (Maria)

Several expressed frustrations with being able to attend district provided professional development trainings due to being recalled to the classroom as a result of frequent substitute shortages. Some reported their school sites and districts provide adequate trainings for their

technology needs. Five of the eight participants stated online modalities such as YouTube, webinars, and software tutorials as their primary preference for engaging in research and learning experiences. Three participants self-reported as kinesthetic learners.

> I need to be able to touch, move, play with it in order to understand it. I will do research about it, learn about it, then practice it. It's that constant practicing that lets me understand how it works. (Sam)

Anne reported:

> I am a hands-on learner. I have to be able to play with it and practice it in order to better understand how to use it in my classroom.

Another said:

> If I am able to play with it, then I can find out better how it works rather than just sitting there. I don't remember. I'll walk back to my classroom and I'm not going to remember what to do. (Grace)

Self-help. It became evident that a *self-help* subtheme was necessary after coding passages where participants recounted experiences relating to frustrations due to inadequate and untimely support with technology-related issues subsequently finding it necessary to seek answers on their own (n = 42). One participant reported:

> So, it would be really nice to have people around to help, but typically it's just me. It's usually just me trying to figure it out because I need to know how to use something and no one else knows how it use it. (Sam)

Only one respondent reported the ability to freely explore and experiment with technology sans restrictions due to a strong relationship with the on-site technology person.

Support network. Participants were asked to recall who they identified in the online survey as being part of their support networks. Responses included administration, both on-site and district technology personnel, teachers on special assignment, colleagues, students, and themselves. Through the course of the interviews, 53 passages were identified as referencing

individuals from the participants' support networks. Most respondents cited experiencing positive connections with several members of their support network, however, as two stated:

> I know everything's about money, but it sure would be nice to have a computer lab technician or someone who is at our school to help with our computers like we used to have. (Jean)

> This is our first year without having a computer specialist. Our specialist was a classified staff member but this year the district decided not to have classified staff do that anymore and said technology was our responsibility as classroom teachers. (Dorothy)

Similar to the respondents above, most participants expressed the desire to have more access to technology experts for troubleshooting and support as many of them are part-time and floater employees with full workloads or were recently discharged due to budgetary restrictions.

> We have an IT department who installs, but there are so many schools. It's hard for us to get support in technology because their department is pretty small. We have to put in work orders.

Sam continues to explain:

> The ones that are quick are related to the students but if the issue is with a teacher computer it gets bumped lower on the list and takes longer. I never know when I am going to get help.

Theme 5: Technology integration. Through a deeper dive into their current and past experiences with utilizing technology for lesson planning, preparation, and for instruction within the classroom setting four subthemes regarding technology integration were evident within the 186 coded passages as represented in Table 12 below.

Table 12

Technology Integration Thematic Findings (N = 186)

Theme	Subthemes	Anne (*n*)	Dorothy (*n*)	Emma (*n*)	Grace (*n*)	Jean (*n*)	Maria (*n*)	Sam (*n*)	Whitney (*n*)
Technology Integration	Evolution of Technology	7	4	1	5	2	3	4	1
	Impact of Technology on Students	4	5	5	10	5	9	9	4
	Leveraging Technology	3	18	1	11	8	11	10	7
	Technology in Planning	1	4	0	7	6	9	6	6

Evolution of technology. The most noteworthy finding of the evolution of technology as reported by multiple respondents in the 27 coded passages is summed up below.

> I'm able to reach kids differently that I couldn't do 13 years ago. I can manage things a lot easier with technology, I have one kid who does not write at all and it's like giving him access to things that can support him. (Anne)

Others expressed being able to incorporate more into delivering instruction and the learning experience due to the accessibility of technology in the classroom.

> I like having iPads in the classroom because I can do a lot of automatic grading. I can just assign it online, the students can do it, and then it grades it for me. (Grace)

With regards to the shift in education, one participant noted:

> There's been a shift now; we're using technology to teach to fill in holes and using technology for other modes. I don't remember ever having Mimios, Smartboards, or projectors until I started teaching. It was just a whiteboard and it wasn't an interactive whiteboard. (Sam)

However, some believe that there are basic skills that have been sacrificed in the evolution of technology, and while it is crucial to teach to the needs of the 21st Century students, children should be able to "look up words in a dictionary" or "write in complete sentences."

Impact of technology on students. This subtheme generated the second most coded passages (n = 51) from all eight interviews with participants discussing the impact of technology on their students. Responses ranged from students being better prepared for high school to a higher level of engagement among students and parents. One participant reported the benefits of using Google Classroom.

> The kids love to do it. The parents love getting to see it and it's not just the child coming home and handing you a stack of papers, but they actually explain what they were doing and why they're proud of it or why they think they could do better. (Dorothy)

Dorothy continued by saying:

> Anytime technology is involved student engagement is higher. It's something that's more interesting to them. It brings a whole new element of engagement that piques their interest; they're more inclined to stay engaged and learn.

One participant expressed concerns with potential oversaturation of technology in the classroom.

> There can be too much novelty and variety so I try not to do it for every lesson, but I will sprinkle in lessons here or there. I think that sometimes you can overuse technology and it just becomes boring because it's just something that's always done. (Sam)

Leveraging technology. The most predominant subtheme of this theme, *leveraging technology* was assigned 69 times throughout all fourteen of the qualitative interview questions. This subtheme arose from the discussion on the impact that technology integration has on student learning. Coded passages refer to ways in which technology is leveraged in the classroom setting to further engage students in the learning experience, and in some instances, are cross-coded with *Examples of Technology in the Classroom*. One respondent recounted an experience where students were tasked with participating in a history day challenge by creating PowerPoint Presentations, filming themselves performing a memorized monologue, and submitting them to the State of California. The subject goes on to explain:

> They ended up winning and going to State. We got to fly up to Sacramento and present. It was their first time on an airplane; and we got to tour the state capitol. It was all paid for by the district. They felt so special and empowered. (Jean)

Other participants described experiences where they were able to introduce 3D printers and robotics into their classrooms to teach coding, programming, and animatronics. Another respondent reported being able to turn a regular whiteboard into a SmartBoard with the use of a Mimio in order to provide more engaging and dynamic math lessons; and another explained being able to leverage technology to better differentiate for students on Individualized Education Plans (IEP's) while concurrently supporting at-grade level students by:

> ...providing remediation for my students with learning deficiencies by using Study Island on iPads while my students who are gifted or already have a solid foundation of fourth grade standards can be working on laptops at their level. (Grace)

Technology in planning. When asked to reflect upon the ways in which they utilize technology in their lesson planning, most respondents reported using a variety of resources like Teachers Pay Teachers, YouTube, and district adopted testing programs (such as ATI Galileo or iReady) to guide standards-based lesson development. Google Suite and Dropbox were frequently reported as being the preferred platforms to organize and maintain resources. One participant discussed the importance of using a digital planner to keep personal and professional tasks, notes, and events organized. Additionally, Google Classroom was regularly referred to as the primary online platform to assign classwork and in some cases, lesson plans for substitutes.

> I like being able to still connect with students via Google Classroom during a sub day while dropping the sub plans in a folder on the drive and attaching bit.ly links. (Whitney)

Passages that also discussed utilizing technology in research while planning were coded as part of this subtheme. One participant explained watching webinars through their district's special

education consortium on how to incorporate Google Read and Bookshare into lessons in order to better support students on IEP's.

Key Findings

The sample group demographic descriptions, responses from the online survey, open-ended questions, and one-on-one interviews generated key findings that contributed to the overall understanding of motivation as an influence in integrating technology in the classroom setting and how actual or perceived barriers and challenges affect that integration process. A diverse sample of 172 K-8 certificated elementary teachers responded to the request to participate in the online survey; eight of which agreed to participate in follow-up one-on-one interviews. Rich responses from all respondents inspired several key findings.

Participants who expressed seeing the value in integrating technology in the classroom often possessed early adopter tendencies; being highly motivated individuals and self-directed problem solvers. Additionally, they presented as being intrinsically motivated, displaying innovator-like traits often seeking out new and innovative technologies to regularly integrate into their teaching repertoire. Responses indicated that these individuals are more likely to be sought out for technology support and were included as high-value members of the respondents' support networks. Frustrations with technology, limitations with devices, and budgetary constraints do not stymie their progress since the findings presented clear evidence of higher engagement and determination when faced with challenges.

While many participants presented as being intrinsically motivated individuals, findings also indicated that several others displayed qualities associated with being extrinsically motivated. These individuals tended to be late adopters, only integrating technology when

explicitly directed by their administration and with the direct support of their support network. Additionally, they commonly expressed being overwhelmed by the limitations and frustrations associated with the application of technology in the classroom setting; and therefore, tended to be more resistant, especially when they perceived a lack of support by others. The findings presented above provide further insight into the impact of motivation as an influence in technology integration. Further discussion of these findings and their implications are shared in Chapter Five, including a summary of the study and the underlying conceptual foundation. Conclusions with associated implications and recommendations are explained.

Chapter Five: Conclusions and Recommendations

This chapter reviews the issues and significance of the study, its underlying theoretical foundation, methods used to answer the research questions, and a summary of the key findings. Implications are organized by the conclusions followed by recommendations for both practice and scholarship. Additionally, a discussion on limitations, study validity, and future recommendations are presented.

Study Issue and Significance

The purpose of this mixed methods study was to explore individual teacher motivations with adopting technology. The goal of this research was to identify the characteristics of intrinsic and extrinsic motivators associated with early and late adopters; outlining specific attitudes and barriers affecting technology integration in the classroom setting. This research adds to the general body of knowledge by discussing reasonings behind why a large number of educators are resistant to change, why these perceived or actual barriers impede the integration process, and how that is manifested during the adoption practices of educators. While there is extensive literature on the need to integrate technology in the classroom setting, the skills required of 21st Century digital learners, and the numerous offerings of hardware, programs, and applications available for usage by educators; little research has been conducted into identifying the reasons behind educators' motivations and the impact their attitudes and perceptions have on technology adoption practices in the classroom setting (Center for American Progress, 2009).

The overall central guiding question is: How does intrinsic and extrinsic motivation influence a teacher's decision to integrate technology in the classroom? This research question was addressed through exploration of two sub-questions:

1. How do individual attitudes impact technology usage in the classroom?
2. How does resistance to change and perceived or actual barriers affect an individual's ability to integrate technology?

Theoretical Foundation

The literature review explored several key concepts related to the evolution of the theory of motivation; including research on specifically to intrinsic and extrinsic motivation. The concept of motivation as a driving force in human behavior was popularized by Maslow's (1943) Hierarchy of Needs and progressed in theory to the job satisfaction model of Herzberg's (1959) Hygiene-Motivation Theory. This served as the catalyst for the more current theories of Self-Determination Theory (Deci & Ryan, 2008) and the interplay among intrinsic and extrinsic motivation as well as Pink's (2011) Theory of Motivation.

Pink's (2011) Theory of Motivation continued to build upon the multi-faced layers of intrinsic and extrinsic motivation with the introduction of the concept that humans are innately motivated to engage simply due to the sheer enjoyment of it and intrinsic rewards gained from the process (Bell, 2010). Pink's (2011) theory purports that the key to increasing intrinsic motivation is to infuse the workplace setting with autonomy, purpose, and mastery; by providing individuals with the opportunity to hone their skills, progress, and feel the work they are doing is impactful to themselves and others (Bell, 2010).

The literature review further explored motivation as it relates to its influence on whether an individual is an early or late adopter based on their prior experiences, inclinations, and beliefs. Additionally, research was conducted on how these motivators affect the successful technology integration practices of preparing 21st Century digital learners for jobs that do not yet exist which

require the use of technologies yet to be invented. This was done through a close examination of the Framework for 21st Century Learning and the National Education Technology Plan (Battelle for Kids, 2019a; National Education Association, 2017; Office of Educational Technology, 2017). Studies revealed that due to the rapid pace at which emerging technologies are evolving, districts and educators feel overwhelmed and unsure how to proceed. As a result, many teachers are struggling to stay ahead of the learning curve; expressing insecurities and apprehensions with adoption practices and distrust in their site leaders due to a lack of clear vision and inadequate site technology plans (Ford et al., 2008). These theories and frameworks provided the structure by which technology integration was examined through the lens of how personal attitudes and resistance to change manifests themselves in the motivations and adoption practices of elementary educators nationally.

Methods

A sequential explanatory mixed methods research design was selected to explore individual teacher adoption patterns; specifically, their motivation and attitudes, and how perceived or actual barriers affect their decisions to integrate technology. Public school educators in the United States currently assigned to grades K-8 were invited to participate in the first phase of the research through an invitation posted on various social media platforms. The survey invitation resulted in 172 educators nationwide completing the online survey. Experts in the field of educational technology and measuring adoption readiness validated the survey prior to distribution. The survey consisted of three sections: several scaled items regarding the participant's experiences and knowledge of technology in the workplace; four open-ended items asking questions relating to their frustrations with technology as well as best practices with

leveraging technology; and a few profession-related demographic items. The survey responses were exported from the survey administration tool (Qualtrics) into spreadsheets (Excel) for descriptive analysis. Qualitative data was exported for thematic analysis using qualitative software (HyperRESEARCH) for the coding process and interpretation.

Survey respondents expressing interest in participating in the second phase of the research participated in a virtual one-on-one interview. The interview included a few demographic items associated with their current teaching assignment with most of the interview focused on questions relating to the successes and challenges experienced with technology integration in their classrooms; including a deeper discussion on their frustrations and previously identified support networks. Interviews were transcribed and thematic analysis was conducted within the qualitative software (HyperRESEARCH). Interview data was reviewed using an inductive open thematic coding process resulting in five thematic categories with 22 subthemes.

As part of the reflexive practice, a research journal was maintained throughout the study. Journal comments and notes were reviewed and considered during the analysis of data.

Summary of Findings

The sample group demographic descriptions, responses from the online survey, open-ended questions, and one-to-one interviews generated key findings that contributed to the overall understanding of motivation as an influence in integrating technology in the classroom setting and how actual or perceived barriers and challenges affect that integration process.

Participants who expressed seeing the value in integrating technology in the classroom often possessed early adopter tendencies; being highly motivated individuals and self-directed problem solvers. Additionally, they presented as being intrinsically motivated, displaying

innovator-like traits often seeking out new and innovative technologies to regularly integrate into their teaching repertoire. Responses indicated that these individuals are more likely to be sought out for technology support and were included as high-value members of the respondents' support networks. Frustrations with technology, limitations with devices, and budgetary constraints do not stymie their progress since the findings presented clear evidence of higher engagement and determination when faced with challenges.

While many participants presented as being intrinsically motivated individuals, findings also identified several other participants displaying qualities associated with being extrinsically motivated. These individuals tended to be late adopters, only integrating technology when explicitly directed to do so by their administration and only with the direct support of their support network. Additionally, the participants commonly expressed being overwhelmed by the limitations and frustrations associated with the application of technology in the classroom setting; and therefore, tended to be more resistant, especially when they perceived a lack of support by others.

Research Study Conclusions

Study conclusions are supported by the findings from both phases of the study. After a comprehensive analysis of the research findings, four conclusions for this study were determined. Each of the four conclusions have associated discussions of implications for both practice and scholarship.

Conclusion #1: Intrinsic motivation plays a more significant role than extrinsic motivation for technology integration. The first conclusion surmises that intrinsic motivation is more impactful on the overall successful integration of technology practices; thus, playing a

more significant role than extrinsic motivation. Motivation greatly impacts all areas of one's life, especially so when it translates to the motivation required to adopt technology and innovative change in the educational setting. It is recommended that districts, administrations, and businesses consider the role intrinsic and extrinsic motivation plays in the successful integration of technology by their employees. As clearly evidenced by the data collected in this study, intrinsically motivated individuals often present as innovators or early adopters in that they seek to integrate innovation more readily than their counterparts. They are typically kinesthetic learners, recognizing the need to play while learning; often displaying a strong preference towards a hands-on learning approach. Their motivation is derived from what they inherently find interesting and actively seek to make connections with what interests them. Additionally, studies support the researcher's argument that these individuals are inclined to engage with learning through curiosity and challenge; rarely allowing limiting perceptions or attitudes towards previous experiences to thwart them from continued growth and progression. Moreover, findings substantiate that these individuals often present as highly motivated self-directed learners in that they are empowered to make their own learning decisions and personalize their process based on their specific learning styles. Self-directed learners understand that self-regulation leads to an increase in satisfaction in learning and comes through identifying and diagnosing their needs, formulating goals, seeking appropriate supports and resources, regularly integrating self-evaluation measures designed to identify gaps in learning, and problem solving possible solutions (Knowles, 1975; Song & Bonk, 2016).

Overall, findings support the researcher's proposal that intrinsically motivated participants were on average more willing to give up personal time to learn, expressing

enjoyment with being on the cutting edge of technology, and recognizing the urgency in preparing their students for successful integration into a highly technology-infused heavily dependent society.

Conversely, findings supported the researcher's argument that extrinsically motivated individuals easily gave in to excuses that prohibited them from integrating technology. They presented as being unmotivated to learn themselves but rather expressed a heavy reliance on others to answer questions, fix problems, and be directed as to how to proceed with utilizing technology in their classrooms. Additionally, their attitudes, inclinations, and beliefs towards technology in general considerably reduced the opportunities for successful collaboration among their more technologically savvy colleagues, thus further impeding the overall adoption process within not only their grade levels, but the school site overall.

This study supports the idea humans are by nature a mix of both motivators, their ultimate drivers are to seek skill mastery, engagement with others, and the opportunity to improve themselves (Amabile & Kramer, 2010; Pink, 2011). It is recommended that districts, schools, and businesses find ways to support their staff with the transition from being extrinsically motivated to intrinsically motivated individuals by providing them with learning opportunities to do so, thus establishing a work environment rich in growth and self-improvement. As Pink (2011) and Ferlazzo (2015) proport, in order to build a community of self-motivated learners, it is necessary to create learning environments rich in choice; promoting autonomy, mastery, and purpose. This research further substantiates Pink's (2011) claim that creating conditions ripe for intrinsic motivation to thrive must include opportunities for autonomy and competency with tasks clear in their relatedness to the "why;" thus establishing a

connection to a broader application and intended outcome of the project. These findings further validate Deci and Ryan's (2017) research that sustainable motivation comes from "within," that long-term change is driven by the force of intrinsic motivation.

Conclusion #2 – The perception of a steep learning curve confounds the adoption process of innovative practices. The second conclusion supports claims made by prior research that educator's perceptions of a steep learning curve plays an influential role in whether or not individuals choose to adopt innovative practices. This became evident through the exploration of how individual attitudes impact the usage of technology in the classroom. Attitudes towards technology determines who adopts innovation and who does not. This study supports previous research that participants who displayed early adopter tendencies were often more innovative and accepting towards change, recognizing the need to evolve with the changing landscapes around them. Moreover, findings further substantiated claims that individuals who displayed late adopter tendencies were often more resistant and unwilling to adapt. As evident in the findings, individuals displaying these characteristics often labored under the perception that a steep learning curve is too daunting to overcome, thus stifling the adoption of innovative practices. Therefore, this researcher argues that the level of unwillingness or resistance to adapt is directly proportional to the amount of negative experiences individuals have had in the past. Individuals who do not see themselves as possessing the skills to learn to use new technologies often fear the risk of failure when trying something new. Self-growth or the evolution of oneself happens when intrinsic motivators meet external forces which gives place for stepping into the unknown allowing for change to occur.

This study's findings support Tomlinson's (2017) claim that successful transformation of oneself occurs when support systems are put in place to serve as guides throughout the process. The researcher contends that while a significant amount of funding has gone into the deployment and training of teachers on special assignment (TSA's[13]), evidence from this study indicates they are the least sought out type of support utilized within the support network despite acknowledgement of their perceived value. As such, the researcher recommends a reemphasis on the ways in which TSA's utilize their extensive knowledge and roles as change agents in schools and districts to better showcase their skills and actual value; dispelling any possible reasons for their underutilization. Moreover, the researcher recommends schools and districts emphasize that TSA's do not evaluate educators but are rather educators themselves serving in support capacities designed to partner with educators based on a common theme of trust and respect (Wolpert-Gawron, 2016). Every endeavor to aid in the recognition of their place in the support network, increase their value, and subsequent usage among educators potentially decreases the tendency to resist innovation. Furthermore, the researcher argues that by accessing these individuals on a more regular basis educators can leverage their unique and varied skills to aid in overcoming the perceived steep learning curve currently hindering the adoption processes of innovative practices; since some of the roles of TSA's are designed to provide professional development opportunities, co-teach, model best practices, offer encouragement, and support where needed.

[13] Teachers on Special Assignment are often referred to as either TSA's or TOSA's depending on their district's preferred language. Some districts prefer to refer to them as Instructional Coaches since many of their job descriptions and roles are similar.

The researcher recommends districts, schools, and businesses address their employees' limiting perceptions and attitudes towards the learning curve through targeted professional development trainings with their trusted support networks. By doing so, it not only allows for limiting beliefs to subside but enables the individuals experiencing them to address their needs in a healthy manner ensuring their ability to deliver purposeful and relevant instruction to their digital learners. With the recent COVID-19 pandemic, now more than ever teachers across the nation are experiencing a forced shift in the way in which they deliver instruction. From the study's findings it is clearly evident that those participants already struggling to integrate technology and address their concerns with the learning curve will continue to struggle without proper support as they attempt to shift from the familiar traditional setting to the distance learning environment. The researcher argues their success in shifting greatly depends on the technological savviness of each educator and resiliency to adapt as they attempt to readjust their pedagogical practices for the foreseeable future of their professional careers.

Conclusion #3 – Generational stereotypes continue to impede the integration of technology in the classroom. While exploring the barriers and attitudes that impede the adoption of technology, an unanticipated underlying concept continued to surface throughout all phases of research collection. An analysis of the data uncovered several key stereotypical attitudes towards specific generations; resulting in a common thread in stereotypical responses. While the responses were not directed solely at one particular generation of educators since at least three generations[14] are represented in the current teaching population, compelling evidence pointed to

[14] Baby Boomers, Generation X, and Millennials

many stereotypical comments[15] seen across multiple generations. Findings indicated that younger educators tended to stereotype their older colleagues as resistant toward adopting technology, claiming a general unwillingness to integrate technology due to a deeply engrained desire to maintain status quo as a result of firmly cemented routines, procedures, and long-held beliefs. Additionally, participants often portrayed their older generation counterparts as fearful of many aspects of technology integration; namely digital tools, resources, and navigating the internet; further perpetuating harmful generational stereotypes and widening the divide among colleagues. Upon closer examination of the findings, fears were defined as being associated with feeling overwhelmed with the sheer volume of technological options available for implementation, the effects that said implementation has on upsetting pre-established routines and procedures, and the overall unwillingness to give up traditional though arguably outdated skills like cursive, good penmanship, and addressing envelopes. Subsequently, findings indicated that older generations typically viewed their younger counterparts as inexperienced and unaware of what it takes to be really good educators, further exacerbating ageism and reverse-ageism among colleagues.

Evidence also substantiated that members within the same generation often downplayed their capability to learn something new and expand their skills set; admitting that their age prevents them from evolving as a user of technology and their self-doubt blocks them from being secure in their own skills and knowledge. This research's findings align with Keengwe and Onchwari's (2009) belief that teacher's attitudes toward themselves and their ability to deliver

[15] Generational stereotypical comments towards older generations is referred to as *Ageism*, while generational stereotypical comments towards younger generations is often referred to as *Reverse-Ageism*; (Raymer, Reed, Spiegel, & Purvanova, 2017).

instruction has a direct bearing on outcomes in the classroom; that ultimately their confidence in themselves determines whether or not they are successful in delivering innovative and impactful lessons to their students. Evidence supports the claim that technologies that are newer to older generations are part of the younger generation's everyday lives. Every generation has a unique approach to learning based on how they were taught when they were students. Subsequently, this learning approach has an impact on how they implement new skills, such as technology, into their teaching repertoire (Bledsoe, 2018). It is recommended by the researcher that providing individualized or small group trainings tailored to meet the needs of the educator and sensitive to generational and personal learning preferences will significantly increase the probability of dispelling negative attitudes and limiting perceptions of barriers thereby increasing the likelihood of their employees more readily adapting to innovative practices.

Rotherham and Willingham (2009) ascertain that every generation has a unique approach to education based on how they were taught when they were students themselves. This study provides further evidence supporting the concept of varied learning styles in accordance with generational and individual preferences. However, the researcher does not condone the limiting stereotypical attitudes of the participants' beliefs and viewpoints towards other generations; rather arguing instead that learning styles are in direct accordance with the personal preferences associated with each individual and therefore, it is recommended that trainings should be tailored to better suit those preferences in order to more appropriately support individuals in the technological evolution of themselves.

Conclusion #4 – The reality of rapidly evolving technology will continue to disrupt integration efforts. The research findings maintain the claim that the educational services sector

as a whole is struggling with the rapid pace at which educational technology is evolving. Findings indicate one of the main tenets of frustrations with adopting technology among all participants, regardless of motivational inclinations, is outdated and defunct hardware and infrastructure due to budgetary constraints. As one participant expressed, technology "is a bottomless money vault," since districts, schools, and businesses struggle to keep up with the pace at which technology becomes outdated. Additionally, there is clear evidence demonstrating that mandates and unrealistic expectations from districts and administrators coupled with outdated technology create situations where educators feel hindered from providing technology-rich experiential learning opportunities for their students. Christensen, Horn, and Johnson (2008; McCrea, 2010) believe that the disruption caused by evolving technologies would happen organically; and as evidenced in this research to some degree, it has. However, Horn (McCrea, 2010) conceded that the sheer magnitude required to shift a large, heavily bureaucratic system such as the educational services sector often results in a lack of movement. So, this researcher argues that despite the mountainous research on the urgency for educational reformation the status quo continues; creating a digital divide too large to satisfy.

The final conclusion speaks to the idea that, if the educational services sector continues on its current trajectory, the disruption caused by evolving technologies will most definitely continue to widen the gap between the monolithic mold of the traditional classroom setting and the needs of the 21st Century student-centric learning system. Therefore, it is recommended that districts, schools, and businesses critically consider the long-term ramifications that disruptive technologies have on the current traditional method of instructional delivery and the organization of the classroom setting. The researcher contends that some positive shifts have been made with

the introduction of student-centric instruction, problem-based learning, and the Common Core State Standards (National Governors Association Center for Best Practice, 2010); however, the educational services sector as a whole remains untouched. With the recent inception of the COVID-19 pandemic, educators are being forced to shift their pedagogical practices, yet once it is deemed safe to return to our brick and mortar classrooms this researcher questions, what, if any, changes will be made? Furthermore, is it reasonable to assume that the delivery of instruction would return to the pre-pandemic methods or will the technological disruption continue at a more rapid pace?

In Deloitte's 11th annual Tech Trends 2020 report, it is their belief that lasting educational change to address the reality of rapidly evolving technology must occur through the implementation of the following principles (Deloitte Development LLC, 2020).

> Architecting for longevity and adaptability requires a deep understanding of both today's realities and tomorrow's possibilities. It requires an appreciation for the [disruptive] technology and market forces driving change. And finally, it requires a long-term commitment to focused and incremental progress.

This researcher substantiates Deloitte's belief and further argues that changes to both the educational services sector and business realm must occur promptly through the design and deployment of targeted, systematic, and long-term transformations to their organizations geared at addressing the disruption caused by rapidly evolving technology.

Limitations and Study Validity

This study was limited to an abstract population of K-8 certificated elementary teachers currently teaching in public schools nationwide. While there was a good survey response, there is no way to know whether these individuals are truly representative of the entire population of K-8 educators. Due to the limited number of demographics gathered, only professional variables are

known about these individuals. All data is teacher perceptions and self-reported practices since no actual observations of practice were collected. As a result, other studies may yield different findings due to variations in demographics and educator experiences. In addition, motivations, inclinations, and attitudes of teachers may differ based on the school districts and infrastructure within which they work. Exploring specific settings such as non-public school settings or different grade levels may result in very different findings. While the sample utilized in this research may not be representative of the entirety of educators across the country, the results can be used to guide decision making and inform others of the effects of motivation and attitudes on technology integration practices. The importance of rethinking the design and delivery of professional development as well as the need for disruption of the status quo for technology usage in 21st Century classrooms is critical.

Study validity was supported through several processes. Both the survey and interview protocols were validated prior to use by a peer reviewer. Modifications to the tools were made based on the feedback given and pilots were conducted prior to implementation. Triangulation of data was employed within this multi-phase mixed methods study. By using a variety of data sources, the interpretation and subsequent conclusions enabled a clearer understanding of the issue thereby reducing uncertainty in interpreting the data (Gray, 2009). Evidence was gathered from multiple sources: completed online surveys with a mixture of quantitative and qualitative responses, one-on-one recorded interviews, and a research journal with anecdotal notes. The researcher used electronic tools to conduct, collect, and analyze the data. Qualtrics was the survey administration tool used to capture data. Interviews were conducted via Zoom and an online transcription program (TEMI) to transcribe all recorded interviews. To ensure the

accuracy and reliability of the interpretation of qualitative data, the researcher conducted an in-depth thematic analysis, utilizing HyperRESEARCH software. Furthermore, the researcher fully reviewed and accurately coded all data multiple times and engaged the assistance of a peer reviewer with extensive experience in higher education research practices to confirm a reliable coding process.

With extensive knowledge of technology innovation, intrinsic motivation, and adoption propensities in the classroom setting; the researcher has over two decades of experience with leveraging technology, supporting colleagues, and providing professional development trainings to those in need. The researcher also has experience serving as a member of several district educational technology committees and has partnered with professional organizations to better integrate technology into their business practices and provide strategic educational technology-based employee trainings. Therefore, various bias reducing methods were also used. The researcher used reflexivity during the research gathering process to ensure that all data and findings were accurate, minimized the effects of bias, and participant's identities were protected. Research journal notes were carefully taken and reviewed multiple times checking for accuracy.

Recommendations for Future Research

This research provides insight into the tendencies of early and late adopters, their relationship with intrinsic and extrinsic motivation, and their inclinations towards adopting technology. A few topics are highlighted below as potential areas for future research for practice and scholarship as they relate to the motivations and attitudes of individuals and their technology adoption practices.

Professional Development Practices. The researcher argues that further research is warranted into investigating the best practices of organizations who are currently integrating technology support into their professional development trainings; specifically detailing the structure type, content provided, delivery of training, and follow-up support practices. By doing so, schools and districts will have a better understanding of what is lacking in existing practices so as to develop more valuable professional development processes designed to better support educators in improving their instructional delivery methods. Additionally, the researcher recommends investigation into organizations successful in creating an environment supportive of intrinsic motivation practices and how that influences long-term technology integration processes. The researcher recommends further investigation into teachers on special assignment (TSA's) and the discrepancy between their perceived value as support personnel and their low rate of utilization by educators. Investigation into the reasonings behind their underutilization would benefit the general body of knowledge in that it would provide a better understanding of the barriers limiting their full potential as valuable resources and mentors. Furthermore, the researcher recommends exploring the best practices of schools and districts who are currently utilizing their TSA's on a regular basis for professional development trainings and support within the classroom setting so as to strengthen the relationship among colleagues and provide opportunities for the *teachers teaching teachers* model of lifelong learning.

Effects of Generational Stereotypes and Attitudes. The researcher recommends that further research is warranted into understanding how best to overcome these limiting attitudes and behaviors in order to create a unified and successful workplace environment. Part of the movement toward more effectively servicing 21st Century digital learners is greater collaboration

among colleagues. This researcher argues that a crucial step in ensuring the success of the students and the longevity of technology integration in the classroom is by dispelling harmful stereotypes and finding ways to celebrate the expertise of all educators. One of the ways in which this can be done is by surveying educators using tools similar to the Generational Stereotypes Index to investigate and uncover possible generational stereotypical attitudes currently being perpetuating within organizations (Raymer, Reed, Spiegel, & Purvanova, 2017). By utilizing a survey tool such as this, researchers can add to the current body of knowledge by providing valuable data regarding harmful generational stereotypes present in the workplace with recommendations on addressing and dispelling them. Furthermore, the researcher recommends schools and districts develop future training opportunities and staff meetings to address, discuss, and potentially eradicate any current limiting attitudes and bring unity among their staff.

The researcher recommends that districts, schools, and businesses seek to create experiences where less technologically savvy individuals have the opportunity to practice utilizing technology in a safe environment with the encouragement of their support networks allowing them the time to develop sophisticated and essential skills which can then be applied to their profession. This study's findings substantiate the view made by Carroll (Eduviews, 2008) regarding the need for implementation of learning teams encompassing cross-generational members to address the needs of the students with an emphasis on collaboration and the sharing of expertise as a means for dismantling generational stereotypes. Understanding that age is not the sole proclivity of harmful stereotypes; the researcher recommends leveraging the strengths and knowledge of all members of the learning teams to train and support one another since it would afford administration, districts, and businesses alike the ability to take full advantage of

the collective's experience (regardless of age) and better enable successful integration of technology in the classroom and business settings (Hayes, 2013).

Investigation of Self-directed Learners and the Learning Process. While this study explores the relationship among adoption tendencies and attitudes, motivations, and technology integration; more exploration into the self-directed learning process and its effects on technology integration in the classroom would be beneficial to add to the general body of knowledge. The researcher recommends investigation into the learning outcomes of self-directed learners to determine the quality of the overall learning process to shape future training opportunities designed to better support others in the learning process. Moreover, future research investigating the factors, experiences, and inclinations shaping the development and motivational tendencies of adult learners would be beneficial to study in that it would provide researchers with valuable information in what drives the self-directed learner.

Addition of Classroom Observations. With the addition of classroom observations to the multi-phase data collection process, future researchers would be able to ascertain whether or not survey and interview responses provided by the participants were accurate and witness first-hand their pedagogical practices directly within the classroom setting. The addition of in-person anecdotal notes written in the researcher's journal would produce a richer data set for analysis. The addition of classroom observations and more detailed anecdotal journal notes to the triangulation of data would also further reduce possible uncertainty in interpreting the data thereby strengthening the credibility and validity of the study's findings.

Effects of the COVID-19 Pandemic. Unforeseen implications associated with learning during these unprecedented times of COVID-19 will invariably continue to manifest as educators

prepare for the next school year and society begins to adjust to a "new normal." Additionally, it is unlikely that the evolution of technology will stall as a result of this pandemic. As such, the current condition of society and the educational system left in the wake of COVID-19 has demonstrated the importance of continued research into technology integration practices; especially in order to better understand the implications that quarantine mandates and societal restrictions have on motivational drive, personal growth mindset, learning preferences, and technology adoption practices.

Data for this study was collected prior to the onslaught of the COVID-19 outbreak in the United States. Therefore, it is recommended that future research be conducted into whether or not shifts in motivations, attitudes, and mindsets occurred within this study's sample group as a direct result of the forced transition from brick and mortar to online learning environments. The desire to follow-up with this study's participants to re-survey and re-interview them would be to discover whether or not they felt successful adjusting to the forced disruption of their pedagogical practices; and what, if any, new barriers resulted from the expedited transition to online learning. Furthermore, it is recommended by the researcher that there be a specific focus on ascertaining the implications that forced disruptions have on intrinsically and extrinsically motivated individuals and identifying how that impacts the integration practices and attitudes of early and late adopters. Comparisons of findings between both studies would be a valuable addition to the general body of knowledge by providing vital research findings that directly compare educator responses prior to and immediately after a major pandemic in the United States. These results would be beneficial for comparison and add a unique perspective into the educator's ability to quickly adjust pedagogical practices and attitudes in times of uncertainty,

forced disruptions, and societal unrest. Recognizing that every district implemented their own unique set of guidelines and requirements and every state's mandates differ in methodology, budget, and expectations; some adjustments to the study's survey and interview questions would inevitably be required.

Further research into the financial impact that COVID-19 has had on the educational services sector in equipping their educators with the appropriate technology (devices, WiFi, online programs/platforms, etc...), materials, and trainings to sufficiently meet the needs of their employee's new workload expectations over the last three months and into the next school year would be valuable to better understand the ramifications of pandemics on the educational system. Subsequently, it is recommended that additional research be conducted into both the financial impact and preparation requirements that working remotely has had on the educator's own pocketbooks and mindsets as they recently shifted their pedagogical practices and into the foreseeable future. Tracking teacher retention rates prior to and for a period of time after the pandemic would be beneficial in determining the longevity and feasibility that forced transitions between onsite and online learning environments have on educator turnover and long-term workforce sustainability.

Additionally, it would be noteworthy to conduct further research into determining whether educators as a whole (not specific to this study's participants) were able to practice agility and adaptability in transferring their instructional and pedagogical practices online as a result of the disruptiveness of immediate and unforeseen distance learning measures placed upon them caused by COVID-19. Further discussion as to their attitudes, mindsets, drivers,

experiences with building an engaging online learning environment, and responsibilities as new online educators would also be areas of interest to gather research.

Closing Comments

These findings reaffirmed the researcher's belief that, despite the mountainous evidence on the demands for educational reform and the critical need for the immediate revamping of professional development and training opportunities, little to no change has actually occurred over the last two decades. The frustrations expressed by this study's participants with their continued struggles with outdated technology and lack of purposeful professional development furthers substantiates the need for change. Additionally, without proper supports and scaffolds put in place by the educational services sector and business realm, it is highly unlikely that most of their late adopter employees with limiting attitudes and fixed mindsets would be expected to successfully change; resulting in the continued struggle to adopt technological innovation across all organizations.

Heavy investment into the development and deployment of training programs identifying and addressing potential barriers to growth, dispelling limiting attitudes of its employees, and celebrating and supporting innovators is the only way to ensure continued advancement. Additional support is needed in addressing the socio-emotional and financial impacts affecting teachers as they continue to provide instruction from home due to quarantine restrictions and state mandated guidelines. Creating training programs specifically designed to address the impacts of pandemics, societal unrest, and fears manifesting from living through COVID-19 for both educators and families is also necessary.

The results of this study support the statement that intrinsic and extrinsic motivation truly impact technology integration practices and barriers, whether perceived or actual, ultimately hindering adoption processes. By having a clear understanding of the tendencies and inclinations of early and late adopters; districts, schools, and businesses must employ the concepts of autonomy, competency, and purpose into their professional development opportunities to foster and support an environment ripe for intrinsically motivated technology integration practices to occur. The outcomes of this study provide recommendations to inspire change, identify potential apprehensions in their employees, and work to better support their staff ensuring a higher rate of employee buy-in and longevity of continued technology implementation practices in the workplace setting.

Continued technological disruption is inevitable. As new and unforeseen complications attempt to plague society on a national level and impact the current way of life; it is critical that the educational services sector and business organizations provide the structure by which they can meet the weighty demands placed upon them by the technological disruption and continued effects of COVID-19. The way of life everyone has experience thus far has been forever altered; the new normal is uncertain and can lead to anxiety, fear, and indecision. Everyone has been affected to some degree or another by the recent events of Spring 2020; however, the quality of life of each individual moving forward is directly tantamount to their foundation of motivations, mindsets, and attitudes that they each possess; and will determine their responses as they face what lies before them.

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APPENDIX A

Phase One: Technology Integration Survey

Welcome to the Technology Survey! I am interested in understanding your current beliefs, attitudes, and tendencies to integrate technology into the classroom setting. You are being asked to complete an online survey taking approximately 15-20 minutes of your time asking questions relevant to technology integration. The survey can be taken from any laptop or desktop computer or mobile device with internet access of your choosing.

If you are interested in being interviewed, a link at the end of the survey takes you to a separate survey where you will provide contact information in order that a specific time and location can be arranged. The approximate 45-minute interview can be either in-person or via a virtual platform and will explore further your classroom technology use. The interview will be audio-recorded. Participation in either the survey and/or interview are voluntary.

There is no more than minimal risk associated with participation in this study. The risk associated with participating in this online survey and/or interview may be fatigue or minimal stress due to the time involved. While there are no direct benefits to you, the results of this study will be used to provide teachers and districts with a better understanding of how to promote technology integration in the classroom. Administration and district policymakers may be able to support their teachers with technology training and professional development. This in turn helps provide students with more purposeful technology-infused instruction in the classroom to support their 21st Century digital learning needs.

Your responses to the survey and interview will be kept confidential. Your survey responses are anonymous. The data gathered through the interview will be coded to protect your identity and also the identity of your school. The data will be stored on a password protected external hard drive locked in a safe in the Principal Investigator's place of residence and destroyed within six months of study completion.

For survey and interview related questions; please contact the Principal Investigator, Janel Reyneke (janel.reyneke@pepperdine.edu) or Dissertation Chairperson, Dr. Kay Davis (kay.davis@pepperdine.edu).

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB) chairperson, Dr. Judy Ho. Phone: 402-472-6965; (gsirb@pepperdine.edu).

By providing your consent below; you acknowledge that your participation is voluntary, you are at least 18 years of age, and that you are aware that you may choose to terminate your participation at any time and for any reason.

Thank you,

Janel Reyneke
Principal Investigator
janel.reyneke@pepperdine.edu

- ○ Yes, I agree to participate
- ○ No

Thank you for your consideration.

This survey has five sections. The first three sections are labeled with technology-related items which you are asked to rate. The fourth section is comprised of three questions which you are asked to respond in a short-answer format. The final section is comprised of a brief set of demographic-related (though non-personal).

This survey is designed to allow you to move easily between questions; hence a progress bar and back/forward arrows have been embedded. Although it is not required to answer all the questions, it would be deeply appreciated.

At the end of the survey, you will have the option of downloading a .pdf of your responses.

Thank you again for your voluntary participation in this survey.

Q1 Please indicate the extent to which you agree or disagree with the following statements: USEFULNESS

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
Technology is useful in my job.	○	○	○	○	○
Technology skills are relevant in my job.	○	○	○	○	○
Technology enhances my effectiveness in my job.	○	○	○	○	○
Technology improves the quality of my job.	○	○	○	○	○
Technology increases the productivity of my job.	○	○	○	○	○

Q2 Please indicate the extent to which you agree or disagree with the following statements: EASE OF USE

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
I know how to use technology in the classroom setting.	○	○	○	○	○
I possess the necessary skills to use technology in the classroom setting.	○	○	○	○	○

Q3 Please indicate the frequency of technology usage:
EXPERIENCE

	Never Use It	At Least Once Per Year.	At Least Once Per Trimester	At Least Once Per Month	At Least Once Per Week	At Least Once Per Day
I use an LMS, like Blackboard or Canvas, to prepare my lessons.	○	○	○	○	○	○
I use digital resources, such as: ebooks, videos, and digital slides; to deliver my lessons.	○	○	○	○	○	○
I use a SmartBoard or LCD projector when delivering my lessons.	○	○	○	○	○	○
I have my students use devices as part of my instruction.	○	○	○	○	○	○

Q4 Please indicate the extent to which you agree or disagree with the following statements: LEARNING OPPORTUNITIES

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
Technology enhances learning.	○	○	○	○	○
Technology gives more control over the learning process.	○	○	○	○	○
Technology provides more access and options for learning.	○	○	○	○	○
Technology helps unify learning concepts.	○	○	○	○	○
Technology improves critical thinking.	○	○	○	○	○
Technology motivates students to learn.	○	○	○	○	○

Q5 Please indicate the extent to which you agree or disagree with the following statements: RELATIONSHIP TO CURRICULUM

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
My adopted curriculum allows me to easily incorporate technology.	○	○	○	○	○
I understand how to leverage technology to enhance my curriculum.	○	○	○	○	○

Q6 Please indicate the extent to which you agree or disagree with the following statements: TECHNOLOGY USAGE INTENTION

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
I see the value of integrating technology into my instruction.	○	○	○	○	○
Technology integration is critical to student success.	○	○	○	○	○
I feel obligated to use technology in my classroom.	○	○	○	○	○
I enjoy being acknowledged as a technology expert.	○	○	○	○	○
Learning new technologies is fun and enjoyable.	○	○	○	○	○
I enjoy finding new ways to leverage technology in my classroom.	○	○	○	○	○

Q7 Please indicate the extent to which you agree or disagree with the following statements: OPTIMISM

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
Technology gives me more control over my daily life.	○	○	○	○	○
Technology helps me make necessary changes in my life.	○	○	○	○	○
Technology allows me to more easily do the things I want to do at the times I want to do them.	○	○	○	○	○
New technologies make my life easier.	○	○	○	○	○

Q8 Please indicate the extent to which you agree or disagree with the following statements: PROFICIENCY

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
I can figure out new high-tech products and services without help from others.	○	○	○	○	○
I seem to have fewer problems than other people in making technology work.	○	○	○	○	○
Other people come to me for advice on new technologies.	○	○	○	○	○
I enjoy figuring out how to use new technology.	○	○	○	○	○

Q9 Please indicate the extent to which you agree or disagree with the following statements: DEPENDENCE

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
Technology controls my life more than I control technology.	○	○	○	○	○
I feel like I am overly dependent on technology.	○	○	○	○	○
The more I use a new technology, the more I rely on it.	○	○	○	○	○

Q10 Please indicate the extent to which you agree or disagree with the following statements: VULNERABILITY

	Totally Disagree	Disagree	Not Sure	Agree	Totally Agree
I must be careful when using technology because cyber criminals may target me.	○	○	○	○	○
New technology makes it easy for companies and other people to invade my privacy.	○	○	○	○	○
High-tech companies convince us that we need things that we don't really need.	○	○	○	○	○

Q11 When seeking support for technology related issues, how would you rate the value of each?
TECHNOLOGY SUPPORT

	Not Used	Not Valuable	Somewhat Valuable	Very Valuable
Help Desk/IT Department	○	○	○	○
Colleagues	○	○	○	○
Students	○	○	○	○
TSA's	○	○	○	○
Online Search	○	○	○	○
Online Support Groups	○	○	○	○
Individual Troubleshooting	○	○	○	○
Other	○	○	○	○

Q12 Of the types of technology support you rated as very valuable, please explain why.

Q13 Explain one of your biggest frustrations with using technology in the classroom.

Q14 In your opinion, what are the most effective ways to use technology in the classroom.

Q15 If you could ask for anything to help you more effectively integrate technology into your classroom, what would you ask for and why?

Q16 Select Your Age Range

- ○ Under 30 years
- ○ 31-45 years
- ○ Over 45 years

Q17 Total Years Teaching Experience

- ○ 1-5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ 21-25 years
- ○ 26-30 years
- ○ Over 31 years

Q18 Current Grade Level Assignment - (If Combo - Select ALL that Apply)

- ☐ Kinder
- ☐ Grade 1
- ☐ Grade 2
- ☐ Grade 3
- ☐ Grade 4
- ☐ Grade 5
- ☐ Grade 6

Q19 Teaching Experience - Check ALL that Apply

- ☐ Kinder
- ☐ Grade 1
- ☐ Grade 2
- ☐ Grade 3
- ☐ Grade 4
- ☐ Grade 5
- ☐ Grade 6
- ☐ Grade 7
- ☐ Grade 8

Q20 Highest Academic Degree Obtained

- BA/BS
- Master's Degree
- Doctoral Degree

Q21 How long ago did you complete your highest degree?

- Currently enrolled in a program
- Less than 2 years
- 2-5 years
- 6-10 years
- More than 10 years

Thank you for taking the time to complete the survey.

Please click the next arrow to see your responses with an option to download a copy. If you decide to be interviewed, please bring the copy of your responses. If you scroll to the bottom of your responses, you can click to the next item where you can indicate your interest in an interview.

If you prefer not to participate in the interview, simply close the browser at that time.

Warmly,

Janel Reyneke
Principal Investigator
janel.reyneke@pepperdine.edu

APPENDIX B

Informed Consent for Survey and Interview Participation

PEPPERDINE
UNIVERSITY

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH

Motivations and Attitudes on Technology Integration:
The Impact of Adoption Practices in the K-8 Classroom

Dear _____,

My name is Janel Reyneke and I am a Doctoral Candidate at Pepperdine University, Graduate School of Education and Psychology. I am conducting a study to investigate individual teacher adoption patterns for implementing technology in the classroom.

PURPOSE OF THE STUDY

The purpose of the study is to understand your current beliefs, attitudes, and tendencies to integrate technology into the classroom setting. If you are 19 years of age or older and employed as a K-6 grade teacher in a public elementary school, you may participate in this research.

STUDY PROCEDURES

There are two data gathering procedures: an online survey taking approximately 15-20 minutes of your time asking questions relevant to technology integration. The survey can be taken from any laptop or desktop computer or mobile device with internet access of your choosing. Your responses to the survey will be anonymous. The second data gathering process involves an interview. If you are interested in being interviewed, a link at the end of the survey takes you to a separate survey where you will provide contact information in order that a specific time and location can be arranged. The approximate 45-minute interview can be either in-person or via a virtual platform and will explore further your classroom technology use. The interview will be audio-recorded. Participation in either the survey and/or interview are voluntary.

POSSIBLE RISKS AND DISCOMFORTS

There is no more than minimal risk associated with participation in this study. The risk associated with participating in this online survey and/or interview may be fatigue or minimal stress due to the time involved.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

While there are no direct benefits to you, the results of this study will be used to provide teachers and districts with a better understanding of how to promote technology integration in the classroom. Administration and district policymakers may better be able to support their teachers with technology training and professional development. This in turn helps provide students with more purposeful technology-infused instruction in the classroom to support their 21st Century digital learning needs.

CONFIDENTIALITY

Your responses to the survey and interview will be kept confidential. Your survey responses are anonymous. The data gathered through the interview will be coded to protect your identity and also the identity of your school. The data will be stored on a password protected external hard drive locked in a safe in the Principal Investigator's place of residence and destroyed within 6 months of study completion.

RIGHTS OF RESEARCH PARTICIPANT

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the survey and interview. For survey and interview related questions, please contact the Principal Investigator: Janel Reyneke (janel.reyneke@pepperdine.edu) or dissertation chairperson: Dr. Kay Davis (kay.davis@pepperdine.edu).

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB) chairperson, Dr. Judy Ho. Phone: 402-472-6965. Email: gsirb@pepperdine.edu

PARTICIPATION AND WITHDRAWAL

You can decide not to take the survey or participate in the interview. You can stop taking the survey or participating in the interview ("withdraw") at any time before, during, or after the survey or interview commence for any reason. Deciding not to participate or deciding to withdraw will not affect your relationship with the Principal Investigator or with Pepperdine University.

DOCUMENTATION OF INFORMED CONSENT

You are voluntarily making a decision whether or not to participate in the survey and interview. By completing and submitting your survey responses you have given your consent to participate in this research. By providing contact information and participating in an interview, you are consenting to that process. You should print a copy of this page for your records.

APPENDIX C

Phase Two: Interview Participant Request Form

Thank you for showing interest in being considered for participation in an interview.

By providing your contact information below, you acknowledge that your participation is voluntary, you are at least 18 years of age, and that you are aware that you may choose to terminate your participation in the interview at any time and for any reason.

Thank you,

Janel Reyneke
Principal Investigator
janel.reyneke@pepperdine.edu

Q1 Please provide your first and last name.

Q2 What is the best phone number to reach you. Please include your area code.

Q3 What is the best email address to reach you?

APPENDIX D

Phase Two: Technology Integration Interview

State: I am going to hit the record button now to record this interview.

NOTE: Start Time. As a reminder, recording our interview today will be for the purposes of audio transcription. I am the only one who will have access to this recording.

The format of today's interview will be as follows: I will be asking you a few factual information questions, two to three ice breaker questions, some questions on technology integration successes and challenges that you have experienced, and finally a few questions on technology support.

As a reminder, consent to participate in the interview was previously provided on the participant interview request form.

Ask: Do you have any questions before we begin?

FACTUAL INFORMATION
Interviewee's Name
Interviewer's Name
Interview Date
Interview Location
Time (Start and End Times)
Assignment

- Assigned Grade/s
- Subject Matter
- Number of Years Teaching

ICE-BREAKER QUESTIONS

*If interviewee arrived late to interview, only ask Q1 or Q2; then ask Q3.

*If interviewee arrived early or on time to interview, ask all 3 ice breakers.

Q1. What did you do during your Thanksgiving break?

Q2. Are you reading any good books lately, if so...tell me about your favorite book you are currently reading?

Q3. How is this year's group of students different from last year's class?

INTERVIEW QUESTIONS: SUCCESSES AND CHALLENGES

Q1. Explain your most memorable experience with using technology in the classroom setting.

Q2. Why was this experience so memorable to you?

Q3. What did you learn about yourself and your students from this experience?

Q4. ***If participant brought survey printout; discuss Q13 from survey.**

Say: Please think back to Question 13 from the survey which asked you to explain one of your biggest frustrations with using technology in the classroom.

Ask: Could you please help me understand why you feel this to be one of your biggest frustrations?

***If participant did not bring survey printout.**

Ask: When you engage with technology in the classroom, what do you find to be the most frustrating or most challenging?

Q5. What does it mean to you to be a 21st Century digital learner?

Q6. How has technology changed since you first began teaching?

Q7. What type of impact, if any, do you believe technology has on student learning in the classroom?

Q8. Some individuals believe that technology integration in the classroom setting should be mandatory. What are your thoughts based on this statement?

INTERVIEW QUESTIONS: TECHNOLOGY SUPPORT

Q9. Tell me about your process for learning a new program or how to use a new technological device.

Q10. In what ways do you utilize technology in your classroom and professional growth?

Q11. In what areas do you feel technology integration could be improved at your school site?

Q12. Please explain what you need in order to feel more supported in using technology in the classroom.
Q13. Please identify and explain your preferred method of receiving training and support for technology-related questions or issues.
Q14. If money were no object, what programs/devices/technologies would you ask for to help you more effectively integrate technology into your classroom?

State: This concludes our interview session today. I appreciate your willingness to sit down with me and discuss technology integration in your classroom. Is there anything else you would like to add before I stop recording?

Ok, I will stop recording now. Thank you again for your participation.
NOTE: End Time.

INTERVIEWER'S NEUTRAL/NON-DIRECTIVE RESPONSES

***To be used when needing to be neutral**

"I would just like to get your thinking on this question."
"There are no right or wrong answers."
"Go on..."
"Please explain your thinking."
"Tell me more..."

INTERVIEWER'S PROBING QUESTIONS

***To be used when needed to probe/prompt for further explanation/detail.**

"Would you be able to share more about why you are feeling this way?"
"What do you mean?"
"Is there anything else?"
"Could you please tell me more about that?"
"Could you please explain that?"
"I only want to hear what you think."

APPENDIX E

Graduate School of Education and Psychology IRB Letter of Approval

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: August 22, 2019

Protocol Investigator Name: Janel Reyneke

Protocol #: 19-06-1079

Project Title: Influence of Motivation and Mindset on Decisions to Integrate Technology into the K-12 Classroom

School: Graduate School of Education and Psychology

Dear Janel Reyneke:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

cc: Mrs. Katy Carr, Assistant Provost for Research

APPENDIX F

Thematic Analysis Codebook

CODES by THEME	DESCRIPTION
Theme 1: ATTITUDES TOWARD ADOPTION	
Balance	Evidence of teachers maintaining balance; the importance thereof – specifically with regards to work/life balance and establishing balance with incorporating technology in the classroom environment.
Early Adopter Tendencies	Someone who adopts a technology or trend earlier than their counterparts - generally associated with being an innovator and showing initiative. Typically, individuals who are Early Adopters believe that change or adaptation is necessary in order to stay relevant and move forward as individuals and a society.
Frustrations with Technology	Frustrations with and about technology - generally associated with specific examples of limitations or issues relating to technology within the classroom setting. Can be directed towards district, school site, administration, or technology itself.
Late Adopter Tendencies	Someone who is a Late Adopter is generally resistant to adopting a technology or trend. Has often experienced frustrations with the use of technology or being mandated to implement "something else." Some individuals experience resistance at times and do not believe that change or adaptation is possible therefore often does not attempt change believing that it's too difficult, impossible, or overwhelming to do so.
Theme 2: BARRIERS/CHALLENGES TO TECHNOLOGY	
Budgetary Constraints	Technology issues relating to budgetary constraints either at the site or district level.
Hardware/Software Issues	Technology issues relating to software and hardware.
Infrastructure Issues	Technology issues relating to limited space, location, WiFi, and bandwidth.
Resistance	Resistance experienced by the teachers to integrate technology into their teaching repertoire; resistance experienced by teachers and students with regards to attitudes. Specific examples thereof.
Time	What is lacking, what people generally need more of. If the impossible were possible.

Theme 3: LEARNING	
21st Century Digital Learner	A student of learning in the 21st Century - directly associated with technology usage. Generation of students born into a technologically advanced society. Individuals, students in particular, who leverage technology in learning, socializing, collaboration, creativity, critical thinking, and communication.
Academic Learning Needs	Different academic, social, emotional, or physical differences of students. Different abilities, attitudes, desires, or motivations experienced by the students.
Examples of Tech in the Classroom	Specific examples of how technology is used in the classroom; i.e. devices, programs, software, hardware, etc...
Student Focus and Retention	The student's ability to maintain focus and retain learned information. With regards to attitudes, behaviors, academics, social or emotional issues.
Technology as a Supplement	When technology is used as a supplement to learning.
Theme 4: SUPPORTS	
Administrative Support	The level to which administration is supportive or not within the school site and directed towards teachers - specifically with regards to technology purchasing/support/infrastructure/training, etc...
Professional Development	School site or district related professional development. Related to the usage, implementation, or support of technology-related issues. Teacher preference for self-training and receiving professional development. A teacher's preference with regards to learning style, location, troubleshooting, and control over learning.
Self-Help	Relating to technology supports/learning preferences/professional development preferences...the desire to learn or work issues out solo before seeking outside help. Teacher preference for self-training/learning; common among most interviews which is why it's being included.
Support Network	Network of individuals working to support others with technology or training related issues, whether face to face, remotely, online, or via phone.
Theme 5: TECHNOLOGY INTEGRATION	
Evolution of Technology	How technology has evolved over time - both in general society as well as the school site or district. Specific examples thereof.

Impact of Technology on Students	Examples or scenarios where student learning has been or will be impacted by the use of technology. Generally associated with the classroom or home settings.
Leveraging Technology	How technology has been or is being leveraged/used in the classroom setting; whether in preparation or instruction. Can, at specific times, be associated with teacher's leveraging technology for their own personal, self-elected reasons.
Technology in Planning	How teachers use technology in their lesson planning.