

UNIVERSITY OF OKLAHOMA GRADUATE COLLEGE

FACILITATING LEARNING THROUGH TECHNOLOGY: A COMMUNICATION
PERSPECTIVE ON EDUCATIONAL TECHNOLOGY INTEGRATION IN ELEMENTARY
CLASSROOMS

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PEYTON CHERYL FERGUSON
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A THESIS APPROVED FOR THE GAYLORD COLLEGE OF JOURNALISM AND MASS
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BY THE COMMITTEE CONSISTING OF

Dr. Ralph Beliveau, Chair

Dr. Melanie Wilderman

Dr. Amy Bradshaw

Dedication

To the second grader who said my last name was “powerful,” this one is for you.

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Table of Contents

Chapter 1: Introduction.....	1
Chapter II: Literature Review.....	5
Educational Technology.....	5
<i>Definition</i>	5
<i>Success, Support & Motivation</i>	5
<i>Learning Theories</i>	9
<i>Learning Frameworks</i>	12
Diffusion of Innovation	14
<i>What is the Diffusion of Innovation?</i>	14
<i>Diffusion of Innovation in Educational Technology</i>	18
Teachers' Experiences.....	20
<i>The Gap Between Teachers and Technology</i>	20
<i>Promoting Ed Tech Integration</i>	22
<i>Professional Development</i>	23
Chapter III: Methods.....	26
Sample and Recruitment.....	26
Data Collection.....	27
Data Analysis.....	28
Researcher Statement.....	29
Chapter IV: Findings.....	31
Teachers Experiences of New Educational Technology (RQ1)	31
<i>Experiences with Ed Tech</i>	31
<i>Ed Tech Thought Process</i>	32
<i>Support</i>	33
<i>Role of the Teacher – Elementary to Present Day</i>	34
<i>Ed Tech Improvement (Support, Training, Tech)</i>	35

<i>Important Factor for Implementation.....</i>	35
Trainings for Educational Technology (RQ2)	37
<i>Training for Ed Tech.....</i>	37
<i>Training Improvement.....</i>	38
Positive and Negative Impacts for Teachers (RQ3).....	39
<i>Successful Ed Tech.....</i>	39
<i>Negative Impacts on Ed Tech.....</i>	42
<i>Change in Experience.....</i>	43
Chapter V: Discussion.....	46
Experiences of Educational Technology.....	46
Ed Tech Improvement.....	50
Training.....	51
Limitations and Future Research.....	52
Chapter VI: Conclusion.....	55
References.....	57
Appendix.....	64

List of Tables and Figures

Table 1: Bitner and Bitner (2002) Eight Keys to Success

Table 2: Participant Information

Table 3: Participant Adopter Categories

Table 4: Important Factors in Ed Tech Implementation

Table 5: Training Suggestions Based on Participants' Responses

Table 6: What Would You Change?

Figure 1: LaMorte (2022) Adopter Categories

Abstract

Educational technology is prevalent in today's classrooms. The study explores current challenges in educational technology (ed tech) integration by looking into elementary teachers' background and experiences with technology in the classroom. This thesis recruited six elementary teachers, grades second through fifth, from a local elementary school in the suburbs of Oklahoma City. The researcher interviewed the participants to gain their experience with ed tech, their take on support and training, and their suggestions for the future. Diffusion of Innovation framework worked with the study by determining how quickly (or slowly) the teachers adopted educational technology. The findings showed lack of support from admin, good and bad devices, training from peers and learning companies, along with suggestions and improvements for the future. This research is a communication perspective on educational technology in secondary schools.

Keywords: educational technology, communication, teachers, diffusion of innovation, support, training, improvement

Chapter I: Introduction

“It’s how we teach now” (P2).

Technology has become normalized and has increased in usage, especially in school. Early childhood facilities, elementary schools, high schools, even universities are all using educational technology. ACET (Association for Educational Communications and Technology) (n.d.) has defined educational technology as a *field*, focusing on the ethical study and usage of theory, research, and practices to improve knowledge, develop learning and performance, and strengthen learners through strategic design, management, integration, and assessment of learning experiences and environments applying applicable processes and resources. For the sake of this thesis, the researcher is defining ed tech as the physical technological devices, software, and related experiences educators use to make learning more engaging, i.e. Smart Boards, learning software, laptops, tablets, etc. The goal is to look at how the educators are using educational technology as a product for learning, rather than a process.

Educators have experienced a lack of support and motivation from administrators, along with frustration because of the lack of training and knowledge (Leon, 2023). Studies on educators’ attitudes towards educational technology have documented fear and resistance, resulting in accepting technology as an instructional tool. Teachers have stated that they’re less willing to learn technology on their own if they do not receive training from their administration. “The less they felt they knew, the less willing they were to use it, which further affected the possibilities for more student engagement” (Leon, 2023).

The effectiveness of educational technology requires consideration of learning theories, associated with instruction and student comprehension.

How we theorize the nature of learning has direct implications for the ways we teach, how we arrange classrooms and other learning settings, and how we organize schools and institutions of learning, from preschool to higher education and beyond (Nasir et al., 2021).

Learning can be formal, like schools and other education institutions, or informal, where learners experience life individually (Robinson et al., 2007). It's important to note that no matter how well structured, instruction is just a small aspect of learning. Instruction can often be overlooked by the learners' developmental abilities, needs, and interests. Different frameworks, such as Universal Design for Learning and Problem-Based Learning, as well as learning theories, can immensely help teachers in the classroom if ed tech is well integrated and diffused.

Even though it may seem like integrating technology into schools seems simple, there are a multitude of gaps that include educators' knowledge and emotions that follow integration. Attitudes towards ed tech influence the rate of adoption; if the teacher deems the technology suitable, then they will quickly adopt the technology.

Other gaps include internet or computer access and budget constraints (Dean, 2024). The Century Foundation (2020) has stated that the U.S. has underfunded K-12 schools by almost \$150 billion yearly. This is stripping access to better tools, like technology devices, that can improve students' learning substantially. Another gap to consider is the lack of training. Educators need professional development courses regarding technology, otherwise they may have to depend on outdated practices or experience resource constraints which can lead to poor student performance (Marino, 2024).

Another gap is the lack of support from administrators. Administrators' roles in their districts are complex as today's education system involves a multitude of technology and programming needs (Thompson, 2022). Byrom & Bingham (2001):

School administrators are the single most important factor affecting schools' successful integration of technology.

Many administrators are unaware of the type of technology their staff and teachers are utilizing (Thompson, 2021). Most administrators don't fully understand how to apply the technology to truly create instruction that's engaging. It's time for admin to begin viewing themselves as technology leaders (Thompson, 2021). Thompson (2021) gives three reasons as to why admin should be technology leaders: 1) can assist in crafting the school's mission and vision surrounding technology, 2) see what the faculty are doing with technology in their classrooms, and 3) Understanding the technological tools the faculty utilizes helps assess their needs. "There's a disconnect if the administrators themselves don't know how to use the technology" (Thompson, 2021).

This present thesis will address these current gaps in technology integration by understanding teachers' background with ed tech. Conducting a qualitative, semi-structured interview with eight elementary teachers will help gain a better insight as to why these are the current issues in ed tech implementation. The potential interviewees range from four grades (second through fifth) at a local elementary school in Oklahoma. With in-depth answers and a deep analysis, the responses from the participants will help future researchers understand issues in educational technology integration. It will also assist administrators of school districts on how to be better in their support, motivation tactics, and other factors that contribute to teacher anxiety and fear.

This thesis will expand on learning theories and frameworks regarding ed tech, the different adopters to innovations, and teachers' and the knowledge gap, as well as promoting ed tech and professional development. Additionally, in a scholarly context, this thesis expands on available literature about educational technology, filling the research gap regarding public school teachers and their experiences with it.

Chapter II: Literature Review

Educational Technology

Definition

Robinson et al. (2007) describe educational technology as an ethical practice by facilitating learning, which emphasizes that learning is a primary and fundamental purpose for the use of educational technology. The main issue of education is the relationship of teaching-learning and the organization of learning. Facilitating knowledge puts the attention on the learners and their interests and abilities, rather than the individual identifying and defining the issue that has to be solved. As Robinson et al. (2007) states:

Facilitate is meant to convey the contemporary view that learning is controlled internally, not externally, and that an external agent can, at best, influence the process.

Adopting the word *facilitate* means to avoid the negative and disempowering implications of management and control (Robinson et al., 2007). The present definition of ed tech embraces the term *facilitating learning* to understand that knowledge is controlled and owned by individuals. For this thesis, facilitating learning is critical as the educators are using ed tech to enhance the learners' environment and experiences.

Success, Support & Motivation

It's crucial to look at success, support and motivation in educators as these can affect their work performance. Bitner and Bitner (2002) share eight keys to success in regard to integrating technology into classrooms.

Table 1.

Bitner and Bitner's (2002) Eight Keys to Success

Fear of Change
Training in Basics

Overcoming concerns and anxiety
Providing teachers with knowledge of
basic computer use

Personal Use	Skills that can benefit and support teacher's interest
Teaching Models	What programs can facilitate teaching and learning?
Learning Base	Provides teachers and students the opportunity to be partners in the learning process
Climate	Must be created to allow teachers to exercise without fear of failure
Motivation	Must be present with the transformational process
Support	Teachers must feel support from admin to be successful in the classroom

Not all eight keys are important as some may not relate to others. For example, support can be felt from other colleagues, not administration, and teachers can excel with encouragement from their peers. Training in basics is the most critical out of all, because educators need this skill to successfully implement ed tech.

“Teachers’ motivational styles in the classroom matter” (David & Weinstein, 2023). Motivation molds educators’ behaviors and how they influence learning. Now that technology is becoming more notable in the education system, which is creating resources to improve the classroom environment and teaching-learning process, students are more vigilant and aware of learning because it’s been normalized to use technology for exploration. Educational psychologists have assumed that technology use in the classroom can enhance student motivation. Though technology can assist in learning, the climate in which it’s delivered is critical for student outcome, which comes back to Bitner & Bitner’s (2002) sixth key to success: climate. “Technology use engaged students’ intrinsic motivation, especially when students feel deeply supported by teachers” (David & Weinstein, 2023). Motivation, whether it’s from administration or other educators, and the classroom’s environment can greatly affect how teachers are using ed tech in their lessons.

With Bitner & Bitner's (2002) support, there are two styles of teaching that can scaffold learning: 1) autonomy-supportive, which helps learners' sense of decision, personal desire, and curiosity, and 2) structuring, which involves communications and other actions developed by educators to assist students (David & Weinstein, 2023). In reference to the two styles of supportive teaching, researchers have suggested that integrating technology into hands-on teaching can support students' well-being. The teachers and administrations way of implementing technology into classrooms has an immense effect on students learning.

Educators' motivation drives students, and the integration of technology has assisted learners in their ambition (Carstens et al., 2021). Students feel confident in utilizing technology and completing tasks; this confidence can help continue their motivation in learning, as well as the teachers' in educating and constructing lesson plans.

Those who make the decisions of implementing educational technology must be mindful of the eight keys of success to help teachers through difficult change as well as integration of tech. The roles of a leader have two functions: 1) providing direction and 2) exercising influence with a purpose of organizational growth (Graziano, 2017).

Support is crucial as Graziano (2017) explored the process and product of developing a TPACK (Technological, Pedagogical, and Content Knowledge) leadership assessment tool that aids education leaders with support and guidance for the growth of expanding TPACK training programs.

Technological Pedagogical Content Knowledge's framework is centered around the "emergent form of knowledge that goes beyond all three components" (Graziano, 2017). The guideline recognizes that specific factors impact teaching and learning, hence why knowledge of context is critical to be successful in regard to teaching with technology.

The following questions must be answered regarding the implementation of TPACK: “(1) What is our vision? (2) What resources do we have to support our efforts? (3) What will our institution look like when TPACK is embedded into our teacher preparation program?” (Graziano, 2017). The answers will help teacher education leaders identify where they are now versus where they want to be in the future in order to make progress towards change. These three questions can be crucial when deciding *how* to integrate ed tech.

There’s a need to examine the ways to prepare aspiring teachers to plan, design, and implement technological activities into their instructional practices (Polly & Rock, 2016). Effective technology integration includes the use of technological tools to improve teaching and learning, which also involves using tech to guide higher-order thinking skills (HOTS) and basic technology skills.

With a quick review of TPACK and the effective integration use, research concludes that there are multiple barriers in preparing student teachers to efficiently implement technology into their future classrooms (Polly & Rock, 2016). The two barriers are: 1) a mismatch between student teachers’ experience in learning to integrate technology and how technology is used in classrooms and 2) the lack of experience teacher candidates have in preparation programs (Polly & Rock, 2016).

Carstens et al (2021) examined K-12 educators’ awareness about technology use in classrooms, along with benefits and drawbacks, specifically the impact on students’ learning. Teachers' roles have changed: they are now the facilitator, taking students on a learning journey, learning alongside them rather than teaching them. Teachers use technology toward teacher-led learning, i.e. using Smart Boards for instructional lessons, and that students were more engaged

in learning when technology was involved, which supports Bitner and Bitner's (2002) seventh key: motivation.

Carstens et al (2021) found that educators need more access to devices and that time is critical in order to do research on websites, applications, and platforms that will benefit their students. "With the inclusion of technology in the district, we are opening our students up to so much more information than we could do with the resources within our classrooms" (Carstens et al., 2021). With students participating more in class due to technology, teachers perceive that students have more choices for studying and technology allows them to be self-sufficient learners. Overall, teachers found students were more engaged when technology was involved, there needs to be more training for educators to implement educational technology and motivation is critical for teachers for their students to succeed (Carstens et al., 2021). To keep students engaged, teachers need in-depth training on their devices, as interruptions kill motivation and attention spans, causing disruptions in the classroom.

Learning Theories

Learning is defined as a change in performance from the result of a learner's experience and interaction within society (Robinson et al., 2007). "How one creates, uses, and manages learning resources depends greatly on one's belief about how people learn" (Robinson et al., 2007). Learning theories are a pursuit to describe the human process of gaining knowledge. There are three broad categories of multiple learning theories: behaviorism, cognitivism, and constructivism.

Beginning with behaviorism, this approach focuses on operationalization, operant conditioning, and has the greatest practical effect on theory and practice in educational technology (Robinson et al., 2007). B.F. Skinner became invested in the function of operant

conditioning to academic learning. His “teaching machine” gained attention from the result of his search of issues in group-based traditional teaching. This became known as programmed instruction. Skinner viewed this approach as a practical use of scientific knowledge to practical tasks of education. Skinner’s instructional strategies were then known as “technology of teaching,” which transformed to *educational technology* (Robinson et al., 2007).

Behaviorism is taught and learned using a combination of cognitive, affective, and motor skills (Robinson et al., 2007). Examples of behaviorism in ed tech are using game-based learning software, drill and practice software, such as multiplication tables or learning a second language, and other programs that the learner must use their cognitive and motor skills. Unfortunately, adopting behaviorism has been slow. Learning outcomes are based on test scores, and what students learn in the class tend to be forgotten as soon as they leave the room. Educators questioned if students were gaining skills, for example, their self-awareness and attitudes that are needed to help students in becoming lifelong learners (Robinson et al., 2007). The financial aspects of technology are self-liquidating, as technological interference must replace human labor costs to a certain extent. Behaviorism-based instructions are considered to be expensive and tend to have resistance in terms of a large-scale adoption (Robinson et al., 2007). In other words, adopting behaviorism will be expensive, but there is a huge underfunding in the United States with public schools, and this issue could be resolved. This can lead to more educators fostering behaviorism within educational technology, leading to more engagement in students and an enhancement in TPACK.

Cognitivism entails that “learners use their memory and thought processes to generate strategies as well as store and manipulate mental representations and ideas” (Robinson et al. 2007). This theory gained attention in the states after the publication of Jerome Bruner’s 1960

The Process of Education, which publicized Piaget and Vygotsky's works. Jean Piaget conducted an interview with children and developed the theory that children construct classification systems and attempt to fit objects into their everyday lives, to which Piaget called assimilation. When the children were exposed to conflict, when the objects didn't fit, they altered their mental structures, to which Piaget called accommodation. The cognitivist perspective not only gained legitimacy, but also dominance (Robinson et al., 2007).

Within educational technology, cognitivism focuses on the presentation side of learning, which is the content organization making sense to the learner and being easy to recall (Robinson et al., 2007). The goal of cognitivism is to encourage the learner's thought process, so new information can be refined to expand the knowledge structure of the learner. Audiovisual media, auditory learning, and digital multimedia are examples of the cognitivism approach. There are limitations: the theory is meant to be applied to the cognitive domain, therefore there is less to say about motor skills and attitude. The emphasis is placed on the acquisition of content to make it meaningful, understandable, memorable, and most importantly, make the message appealing within the design (Robinson et al., 2007).

The last approach to facilitating learning is constructivism (Robinson et al., 2007). The constructivist perspective holds the "commanding heights" within ed tech research and evolution. There are five principles derived from this theory: learning in realistic and difficult environments, the integration of social exchange in learning, scaffolding perspectives and the use of multiple representations, support ownership, and nurturing self-awareness of knowledge in the construction process (Robinson et al., 2007).

Situated theory comes from the constructivist theory and it's thought to be that all human thoughts are developed from a specific context (Robinson et al., 2007). It focuses on the social

aspect of learning, with expertise being seen as something that develops within a group who share knowledge and skills. The principles of constructivism address cognitive and metacognitive, affective and motivational, developmental, social, and individual characteristic factors. Constructivism is a learner-centered approach that uses research about the learning process and encourages the development of instruction to individual learners (Robinson et al., 2007).

These three learning theories can assist in identifying *how* educators use their technology skills to integrate ed tech into their lessons. In summary, behaviorism is based on operant conditioning, where the student is given reinforcement to build their cognitive and motor skills. Cognitivism is centered around the arrangement of the content within a given lesson. The last learning theory, constructivism, encourages the students to learn in realistic, yet challenging environments, but learning from peers and supporting different perspectives within the knowledge process. With educational technology, these theories can assist teachers in knowing they have different options with implementing tech and encouraging student engagement.

Learning Frameworks

A framework educational technologists practice is problem-based learning (PBL), which these environments are characterized by a driving question, student participation and collaboration, and the use of cognitive tools (Fitzgerald & Evans, 2024). PBL requires learners to use higher-order thinking skills (HOTS) to address and solve real-world issues (Lowyck, 2014). This framework is grounded in learning theories of situated cognition, constructivism, social learning, and community of practice, which can relate back to the previous learning theories mentioned. PBL can be utilized in constructivism as learners are collaborating with peers to address realistic issues.

Another popular framework is Universal Design for Learning. This guides professionals to design accessible learning environments (CAST, 2024). Fitzgerald & Evans (2014) emphasize UDL on understanding the differences among learners and how learning environments can be treated to promote access to learning opportunities for all. There are six guides to UDL: (1) Purposeful, the internalized self-efficiency that performs in ways that are socially and personally meaningful, (2) Reflective, a self-awareness and metacognition that identifies internal motivation and external effects that scaffold learning and makes necessary adjustments, (3) Resourceful, the understanding and operation of resources, strengths, semantic and cultural capital, (4) Authentic, developing understanding in ways that are genuine, (5) Strategic, identifying goals and overseeing learning with intention and motive, and (6) Action-oriented, a self-directed and collective plan that pursues learning goals (CAST, 2024). With the six guidelines, there are also three core components: providing different means of engagement, representation, and action and expression (Fitzgerald & Evans, 2024).

In educational technology, it's important that teachers and future educators plan with Universal Design for Learning in mind. Not only will UDL assist individuals with learning disabilities, but it'll also aid *all* students. When planning with the intention of UDL, teachers will also benefit because it will then help enhance their knowledge of ed tech and assist in classroom engagement.

Learning is formal, a planned process like schooling, and informal, where learners go through life experiences individually (Robinson et al., 2007). It's critical to know that no matter how well developed, instruction is only just a slim part of learning, and it's often overlooked by the learners' developmental abilities, needs, and interests. Different educational technology frameworks, such as UDL and PBL, as well as a multitude of theories, like behaviorism,

constructivism, and cognitivism, educational technology can greatly help educators in the classroom if well integrated and diffused.

Diffusion of Innovation

What is the Diffusion of Innovation?

Diffusion of Innovation was developed by E.M. Rogers in 1962, originating in communication, to explain how over time people adopt a new idea, behavior, or product, which makes this one of the oldest social science theories (LaMorte, 2022). “Diffusion” is the development in which a new idea, product, or *innovation* is issued through specific channels over time to members of certain social systems (Rogers, 1983). This theory is a special type of communication that is concerned with new ideas, as communication is defined by Rogers (1983) as a process that participants create and share information with each other to reach a mutual understanding. The “newness” of the idea in the message content of communication gives the diffusion a significant role. Diffusion can also be a certain kind of social change, the process of which an alteration develops in the structure and operation of the social system (Rogers, 1983).

The term “innovation” was developed in 1930, used in sociology and cultural anthropology, and it’s connected to the idea of expanding cultural phenomena (Stošić & Stošić, 2013). Innovation is thought to be upgrading, improving, modernizing, and developing, though there are several researchers who have different concepts of the idea, but one stands out. Rogers, diffusion of innovation founder, states that “The idea that innovation is the new individual. It does not matter if the idea is objectively new or not, it is time that has elapsed since its first use or discovery” (Stošić & Stošić, 2013).

This framework has been used for program planning, been empirically tested, and has undergone critique from a multitude of perspectives since its development in the 1950s (Hubbard

& Sandmann, 2007). Diffusion of innovation can provide information on barriers and motivations to educational programs that may have powerful influences on the adopt or reject decision. A few factors include the individual's personality, networks, prior knowledge of the topic, as well as their socio-demographic characteristic.

Challenges include compatibility with pre-existing practices, perceived notions of innovation, and resistance from adopter categories (Chen, 2024). This relates to educators' fear of change, motivation, and climate as mentioned in Bitner & Bitner (2002). With no prior knowledge, like training and guidance, teachers will not be encouraged to implement ed tech into their classrooms.

The process of Diffusion of Innovations has a series of actions and choices with different stages: 1) knowledge - exposure to the product's existence and use, 2) persuasion - formation of a supportive or unsupportive attitude towards the innovation, 3) decision - engagement in the activities that lead to the choice of adopt or reject, 4) implementation - putting the idea into use, and 5) confirmation - seeking support of the innovation-decision that's already been made (Dooley, 1999). There are, of course, other factors that influence the process: existing conditions, characteristics of the decision-making process, the attitude towards innovation, and communication channels.

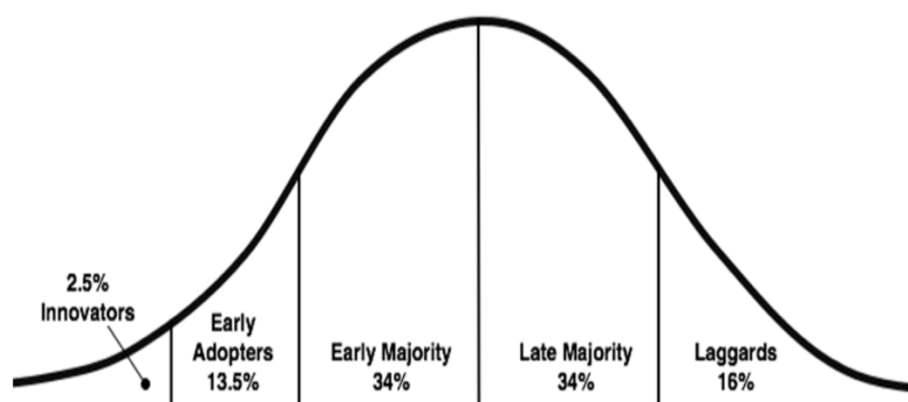
To adopt, this means that a person does something differently to what they've done before, which the key is for the individual to find that the idea, behavior, or product is new or creative (LaMorte, 2022). Adoption is a process; others are more prone to adopt an innovation more quickly than others.

There are five adopter categories: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards (LaMorte, 2022). These categories are visually represented as an S- and

bell-shaped curve, with the S-shape showing the overall number of adopters from innovators to laggards, and the bell-shape representing the normal population (Hubbard & Sandmann, 2007). The S curve symbolizes that there are relatively few adopters, but their influence will impact those who follow (the early and late majority).

Figure 1.

LaMorte (2022) Adopter Categories



Innovators are those who want to be the first to try innovation; they're willing to take risks and are often the first to create new ideas (LaMorte, 2022). Early Adopters are people who represent the opinion leaders; they thrive in leadership roles and embrace opportunities for change. The Early Majority, however, are those who are rarely leaders, but they adopt fresh ideas before the average person. They also want to see the innovation evidence before they're willing to adopt or reject. The Late Majority are those who are skeptical of change; therefore, they will only adapt to an innovation after it's been tested by others. The last category are the Laggards: those who are bound by tradition and are skeptical of change, making them the hardest group to persuade. Understanding these categories shows the social dynamics of innovation diffusion (Chen, 2024). Based on when the teachers adopted educational technology, the specific types of

adopters can support the understanding of why they were in favor of ed tech immediately or waited.

There are perceived attributes within the diffusion of innovation theory, which focuses on how participants view the characteristics under practice: Complexity, Compatibility, Trialability, Relative Advantage, and Observability (Hubbard & Sandmann, 2007). These attributes are important for influencing the rate of adoption to the innovation (Chen, 2024); therefore, the attributes, along with the different adopters, can help this research understand the influence on which ed tech has on teachers.

Complexity refers to how easy it will be to understand and use the idea or product, which will be how likely an individual will accept the innovation (Sridharan et al., 2021). People will resist the adoption of new innovations because of their fear of complexity in purchase and/or usage. Compatibility is the measure of how closely innovation relates to needs, value systems and norms, culture, lifestyle, etc. The higher the compatibility, the quicker the diffusion, and vice versa. Trialability is the ease with which the innovation can be tested and tried, which determines the acceptance rate; therefore, the higher the degree of trialability, the larger the rate of diffusion will be. Relative advantage is how individuals perceive an innovation as superior to other similar products. The last attribute, observability, is the ease with which the product or service can be observed. This means that in an innovative product, to what degree can the product's benefits be observed, imagined, and perceived by potential consumers? (Sridharan et al., 2021). With this thesis, it's assumed that compatibility and trialability will be the highest among the educators interviewed.

Along with diffusion attributes, there are four main elements to the framework: innovation, communication channels, times, and the social system (Rogers, 1983). While the

definition of innovation has been covered, the communication channel is how messages are passed and time involves the decision process, the innovativeness of the group or individual, and the rate of adoption. For this thesis, the researcher will emphasize the last element, social system. This is the set of units that are engaged in collective problem solving to achieve a common goal, which in this thesis is the teacher's adoption to educational technology. Most teachers and educational leaders work in a collective or authority innovation-decision, because teachers work in organizations (Rogers, 1983).

Stressing the social system element in the diffusion of innovation framework, this system gives structure, regularity, and stability to human behavior, allowing those to predict behavior with somewhat accuracy (Rogers, 1983). Structure is the one aspect that can decrease uncertainty because with the importance of diffusion, it can facilitate or impede the development of the innovations in specific systems (Rogers, 1983), for example secondary educational institutions.

Diffusion of Innovation in Educational Technology

Scholars and researchers in education have thoroughly examined how innovations, extending from technological tools to teaching methods, are dispersed across the education system and classrooms (Chen, 2024). Early adopters play a crucial role when influencing the broader education community because they're characterized by their openness to new ideas. Education institutions who accept modern, technological environments will be more successful and not look like traditional schools where the only form of gaining knowledge is a textbook (Stošić & Stošić, 2013). With ICT, information and communication technology, schools can routinely develop their knowledge, as “innovation is the requirement that the school does not remain at the traditional level” (Stošić & Stošić, 2013).

B. Vlahović believed that educational innovation creates and develops a change that brings new attention and positive changes to the current state of the educational process (Stošić & Stošić, 2013). P. Mandić stated that innovation in education involves a coordinated system of teaching, social, organizational, and economic strategies aimed at improving the quality of education. It focuses on making the best use of resources, time, and the creativity of both students and teachers. Mandić acclaimed innovation as developments in educational objectives, the function of school systems, teaching content and performance of teachers, resources, work, organization, integration, and the evaluation of teaching (Stošić & Stošić, 2013).

In teaching, innovation involves developing and using new teaching methods, improving the conditions to successfully integrate these methods, and applying the practical outcomes of educational activities based on psychological and educational research (Stošić & Stošić, 2013). There are norms and behavior patterns (Rogers, 1983) that can conflict educators' decisions with implementing technology into classrooms, like traditional beliefs. Columbia University, between the 1920s and 30s, determined to show that local school control was in relation to innovativeness, which was thought to be an appealing characteristic of educational institutions (Rogers, 1983). The study found that the most single factor of innovativeness in public schools was educational cost per pupil; therefore, the wealth factor appeared to be a prerequisite for ed tech integration. As of 2020, The Century Foundation quoted that the country is underfunding K-12 public schools by nearly \$150 billion per year, meaning more than 30 million students are being robbed of important resources they need to be successful in a classroom. The result of this budget cut means that learners are not receiving the appropriate resources in their schools, excluding them of new knowledge and discouraging their education experience.

Teachers' Experiences

The Gap Between Teachers and Technology

There's an inevitable gap between technology availability and the educators' use of tech for instruction (Curtis, 2020). The demands of the digital age have yet to be achieved by educators (Ibda et al., 2023). Research has shown that classroom instruction is less likely to implement technology as there are several barriers: beliefs, time, knowledge, and willingness to change pedagogical approaches (Curtis, 2020). However, if a teacher decides that an innovation is beneficial, they'll find a way to make a connection in their instruction.

There are feelings of uncertainty when it comes to integration of ed tech. Fear and resistance are two attitudes that are documented towards educators' approach about technology integration (Leon, 2023). Teachers also feel the less they know about technology, the less willing they are to utilize it, which can affect student engagement (Leon, 2023).

These feelings can bring on stress and anxiety, which are also common symptoms of integrating educational technology (Fernández-Batanero et al., 2021). Teachers are more likely to use digital tools if they are relevant to their practice and if they have the appropriate resources, like training, technical support, and the proper equipment (Leon, 2023). Without awareness of the academic possibilities technology brings, lack of training in ed tech, or resistance, this can bring forth the improper usage of technologies, which can be associated with stress and anxiety, and also "burnout syndrome," which is the exhaustion and fatigue due to increasing demands (Fernández-Batanero et al., 2021). This can immensely affect teachers' level of commitment at work. Increasing levels of performance in the management of digital tools, no understanding of ed tech, little to no training, and burnout can have a negative effect on mental health and be a

few of the main causes of the stress and anxiety teachers develop (Fernández-Batanero et al., 2021).

Technology integration starts with preservice courses, student teachers who are in university. Teacher educators can learn an abundance about their programs regarding practices that improve knowledge of ed tech implementation that can carry skills and promote early career teachers by using a data collection method that frequently seeks guidance from recent graduates (Brenner & Brill, 2016). There are two main suggestions for improving the preservice field experience: 1) ensure faculty that teachers are aware of the requirements for technology for student teachers and 2) faculty needs to be aware of the technology access in each school and improve tech resources with relevant, mobile educational technologies that preservice educators can provide for the school. By enhancing student teachers' experience during their college years, they can be more knowledgeable about integrating technology into their future classrooms. This can improve their tech skills and instructional practice skills by learning how to *use* technology for learning.

Preservice teachers feel proficient with basic technology but lack experience with advanced tech (Brenner & Brill, 2016). There are three themes that occurred from teacher education programs that offer the best practices with a regard to preservice teachers and technology implementation. The first theme is technology training for preservice teachers in a subject-specific and instructional technology course, with faculty modeled tech implementation. The second theme is an opportunity for students to create their own tech projects to scaffold learning and teaching and reflect and critique these experiences. The last theme focused on technology-rich environments in college classrooms and field-based exposure with collaborative assistance from teacher education faculty, instructional tech faculty, and supervising preservice

educators (Brenner & Brill, 2016). Colleges and universities, even professional development courses for present teachers, can utilize these three themes for their instruction.

Essentially, barriers can include lack of mentoring, little to no knowledge about technology implementation, and a lack of knowledge about technology in general (Brenner & Brill, 2016). According to Ibda et al. (2023), skills teachers must meet are information literacy, process, and search for technology-based data for instructional purposes. Educators must have specific abilities, such as problem solving, critical thinking, communication, and cooperation in the digital age (Ibda et al., 2023).

Promoting Ed Tech Integration

Something educators can do to promote effective educational technology is encouraging the school district to create a system wide technology plan (GoGuardian Team, 2023). It's important that a technology policy acknowledges equitable access for all learners and to ensure the individuals know how to access the technology. The federal government introduced Preparing Tomorrow's Teachers to Use Technology (PT3) to bring technologies, teacher PD, curricula change, and encouragement to teacher education programs (Brenner & Brill, 2016). During a retreat, participants from the College and University Faculty Assembly (CUFA), the Association of Mathematics Teacher Educators (AMTE), the Association for the Education of Teachers in Science (AETS), and the Conference of English Education (CEE) discussed common issues for integrating ed tech (Bell, 2001).

The six issues include: 1) Schools of education are required to implement technology, but sometimes it's rather taught as an additional topic rather as a background element, 2) The costs are substantial, 3) Technology is seen as a separate subject to be added on a full list is curriculum and it's labeled as a low priority, 4) There's limited knowledge that examines tech's benefits to

learners and many teachers are unfamiliar with the literature that's been published over the subject, 5) There are poor examples of technology in education that steer teachers away, and 6) Even though preservice teachers are trained to implement tech during their schooling, many are confronted with barriers of access to technology at their schools.

These barriers are why it's critical to promote educational technology, as teachers and administrators can face these challenges sooner, rather than later. "Equitable access to technology is worth fighting for" (GoGuardian Team, 2023). Suggestions to fight for equitable technology include using partnerships with other districts and external organizations, applying government resources such as Federal E-Rate Program, beginning digital literacy programs, but most importantly, getting educators involved.

Professional Development

"The progress, stagnation, or decline of education is largely determined by the teacher" (Ibda et al., 2023). Professional Development, or widely known as PD, is the process through which people improve their skills and knowledge, making their professionalism better in a lasting way, rather than just temporarily (Evans, 2014).

Another definition of PD is that it's a process that is behind educators' college and continues throughout their professional life, while being affected by the teachers' characteristics, instructional practices and content (Sancar et al., 2021). This is also known as the conceptual framework of professional development. PD can be delivered in the form of workshops, conferences, courses, or seminars (Ibda et al., 2023). The most important thing to understand about teachers' development is the process of how they grow professionally and the factors that promote and support growth (Evans, 2014). However, it's impossible to figure out the single correct answer to how teachers develop professionally. As quoted by Guskey (1995):

The uniqueness of the individual setting will always be a critical factor in education.

What works in one situation may not work in another... [R]eforms based upon assumptions of uniformity in the educational system repeatedly fail... The teaching and learning process is a complex endeavor that is embedded in contexts that are highly diverse. This combination of complexity and diversity makes it difficult, if not impossible, for researchers to come up with universal truths.

Teachers' professionalism emphasizes how they see themselves and how they portray and execute their work based on their knowledge and teaching practices (Ibda et al., 2023). PD is multidimensional, it's not simply narrowing down people's behaviors, it's also about their changes in attitude, intellectual capacity, and mindsets (Evans, 2014). Secondary educators are overwhelmed with administrative work and have not accomplished professional duties, which can lead to little adaptability (Ibda et al., 2023).

There has been a rapid change in the educational field, with high demands of pedagogical standards, and the needs for superior education, and this has raised expectations on teachers' skills and professionalism (Sancar et al., 2021). Within PD, there needs to be a comprehensive framework to provide meaningful and holistic perspectives. Sancar et al. (2021) suggested that the primary issue withholding educators' PD was not the programming or content, but lack of holistic approaches that interprets all the components in the process.

Understanding PD as a holistic approach stresses that the aspects of the process of PD are interconnected in multiple ways and are not independent (Sancar et al., 2021). Another critical aspect of PD as a holistic process is that there needs to be a roadmap for what should be integrated and regulated by evaluating the effective PD at hand (Sancar et al., 2021). It's very important to remember that PD influences educators, their individual characteristics and skills,

and also learners' outcomes (Sancar et al., 2021). With adequate training in PD sessions, educators' feelings towards educational technology can be rewritten and seen with a more positive attitude.

Considering all the aspects in teachers' experiences and feelings towards educational technology, the present thesis purposes three research questions:

RQ1: What are teachers' experiences of new educational technology?

RQ2: What is training for educational technology like?

RQ3: What are the positive and negative impacts of usage for the teachers?

Chapter III: Methods

To understand educators' experiences with educational technology, the researcher conducted a qualitative analysis, utilizing semi-structured interviews, at a local, public school on the outskirts of Oklahoma City, Oklahoma. The reason for analyzing a public school is because there is a lack of funding in the United States. The country is underfunding K-12 public schools by almost \$150 billion yearly, meaning more than 30 million students are being robbed of important resources they need to be successful in a classroom (The Century Foundation, 2020).

The importance of conducting qualitative research is that this specific approach operates on theoretical frameworks that advise the research issue by addressing the appropriate individuals or groups that are within a social or human problem (Creswell, 2013). Qualitative research takes place in a natural setting where the issue is experienced by the participants (Creswell, 2013), i.e. a classroom. However, for this thesis, the participants will have the opportunity to choose their preferred location, a coffee shop, their home, classroom, or even Zoom, as comfort is the most important to gather trustworthy data.

This method is crucial as qualitative research empowers the individual to share their unique stories, hear their voices, and limit the power relationships that can exist between researchers and participants (Creswell, 2013). The goal is to write a literary, flexible style that communicates stories without the restrictions of academic writing, and to also understand the context in which the participants in the study address the problem (Creswell, 2013).

Sample and Recruitment

Following Snyder's (2017) definition, veteran teachers are those who have worked in education for more than six years, while a new teacher will be defined as an individual with one to five years of experience. This thesis is seeking educational technology experiences between

veteran and new educators to gain a broader viewpoint, following the three research questions previously mentioned. The researcher will be searching for two teachers, one veteran and one new, from four grades, second through fifth, at the local elementary school.

With an existing relationship to a current teacher and a strong connection to the school district, the researcher will reach out to the said educator and snowball sample for participants. Snowball sampling, also called chain referral, is widely used in qualitative sociological research (Biernacki & Waldorf, 1981). Defined by Oregon State's Institutional Review Board (IRB) (2010), snowball sampling is a technique which the researcher asks participants to assist in recruiting other potential subjects. The researcher will contact the teacher, whom she has a connection with, via SMS message stating intentions and purpose of the study. Overall, the researcher gathered six participants, two from two grades, and one from two other grades.

Data Collection

The researcher contacted the educator, whom they have a previous connection with, January 22, 2025. The emails to the other potential participants were sent January 25, 2025. The first interview was conducted January 31, 2025, while the last interview was collected February 18, 2025. The researcher used the semi-structured format, with open-ended questions (see Appendix), which was approved by the University of Oklahoma's IRB before use. With the format being semi-structured, the interviewer could ask other questions based on the participant's response. Questions included experience with educational technology, when it was useful, technology training, what can be improved, support, and the difference between when the teachers were in school versus today. The questions were an expansion of a research proposal from another course at Gaylord College.

Data Analysis

Five out of six interviews were audio recorded with consent. The interviewer put comfort first, making sure the interview was more conversation based. After the interviews, the researcher immediately transcribed the recording and looked for similar answers from other participants. Descript, an artificial intelligent transcribing platform was used. This platform is a toolkit that assists anyone who works with voice audio (Mason, 2017). There are multiple highlights to the AI software: audio word processing, fast, cheap, and accurate transcriptions, waveform editor, web publishing and commenting, and it can non-destructively export to other audio apps. Mason (2017) emphasizes:

By shifting the timeline/waveform to script-based editing, Descripts makes creation easier for newcomers, faster for professionals, and serves as the foundation for new forms of AI-powered media synthesis that are just beginning to emerge.

Table 2 outlines the participants' information and their teaching status at the time of this study. The researcher coded each participant based on the grade they teach and if they were a veteran or new to the classrooms. The chart shows their identification code, followed by the grade, their teaching status, and how many years of experience they have in the classroom.

Table 2.

Participant Information (as of January 2025)

ID	Grade	Veteran/New	Years of Experience
P1	Second	Veteran	19
P2	Second	New	4
P3	Third	Veteran	12

P4	Fourth	Veteran	18
P5	Fourth	New	3
P6	Fifth	Veteran	22

Udo Kuckartz's (2019) Qualitative Content Analysis was utilized to analyze recurring themes and sub-themes. The steps are as followed: 1) Preparing the data, establishing the text, 2) Creating the main categories that relate to the interview questions, 3) Putting the data to the appropriate main categories, 4) Forming subcategories that align with the main, assigning specific text to the subcategories, 5) Presenting the results and category-based analyses, and 6) Reporting and documentation (Kuckartz, 2019, p. 187-188). The researcher went through each transcript, highlighting similar themes and responses and categorizing based on the interview question.

The research questions acted as the three main categories for themes. The interview questions were then categorized under the research questions based on their content. For example, RQ1: What are teachers' experiences of new educational technology? had interview questions 1, 7, 8, 9, 10, and 13. RQ2: What is training for educational technology like? had number 4 and 5 interview questions. Lastly, RQ3: What are the positive and negative impacts of usage for the teachers? included interview questions 2, 3, and 11. Question six responses were combined with two and three as these questions asked what was successful and unsuccessful. The responses from question six were similar to those of two and three, hence the combination.

Researcher Statement

I am coming from a communication background, as my undergraduate studies were in journalism and mass comm. My background allows me to examine the ways teachers are communicating with one another about educational technology: how they are learning from one

another, they're experience with training and how the trainers are getting information across to the teachers, and the support they are receiving from administration and their colleagues. To clarify: I am a in the field of communication looking into educational technology.

My own experiences working with children have led me to this study. I began working at a daycare my last semester of high school and ended up falling in love with education. I have also substituted in secondary schools, elementary and high school, and shadowed teachers, which gave me the experience and understanding of educational technology, as well as seeing it firsthand. This experience helps shape my views because I understand what the teachers are going through and how they handle situations, as well as being the one handling ed tech situations. The responses will provide comprehension to know what necessary changes need to be made for the future of educational technology.

Chapter IV: Findings

At the end of the data collection, six educators, four veterans and two new, participated in the qualitative interviews. The themes are categorized by the three research questions, in order by experience, training, and the positive and negative impacts of using educational technology from the teachers' perspective, which involves successful and unsuccessful technology and experiences using devices. Participants also gave suggestions for better in-depth training and what can be done to better implement technology in educational settings.

Teachers' Experiences of New Educational Technology (RQ1)

The first question asks about the educators' experience with ed tech. This ranges from the most important aspect, to implementation, support from peers and administration, improvements for ed tech, the role of a teacher from when they were in elementary school to present day, and their thought process when they were first introduced to educational technology.

This thesis defines ed tech as the tools and ideas used to help learners expand their knowledge. Examples can include Smart Boards, laptops, learning software, tablets, etc. These devices can improve students learning experiences to help them succeed.

Experiences with Ed Tech

Many of the participants had different experiences with educational technology, but overall feeling positive about the direction ed tech is taking. P1, Second Grade Veteran has been teaching for 19 years, with their best experience with ed tech being at a previous school in rural Oklahoma. This district had high quality technology, with the latest devices, and the students had one-to-one iPads. Now, the current district P1 teaches at have slowly adapted to one-to-one Chromebooks for every student, along with Smart Boards and interactive televisions and boards

in every classroom. With digital resources, teachers are saving paper products and physical resources for desperate times, i.e. Wi-Fi and internet going down.

Many of the interviewees mentioned that Chromebooks and interactive boards have been a positive experience with their digital curriculum. Being able to assign lessons and activities, like on Google Classroom (P6, Fifth Grade Veteran) online has saved time and resources. Some teachers touched on how technology has become normalized in educational settings. “I feel like it’s how we teach now. It’s just the world we live in” (P2, Second Grade New). P2 emphasized that technology has brought a lot of the students’ growth, representing the positive in ed tech. However, it can also bring negativity as students are clinging to tech too much, resulting in an addiction as P3 Third Grade Veteran said.

Other comments included adapting to different devices: “You learn very quickly” (P3, Third Grade Veteran). One teacher, P5 Fourth Grade New, had an “absolutely atrocious” time during their very first year of teaching, but eventually their experience improved, emphasizing the success of Chromebooks.

Ed Tech Thought Process

Table 3.

Adopter Category Based on LaMorte (2022)

Participant	Adopter Category
P1, Second Grade Vet	Early Adopter
P2, Second Grade New	Early Adopter
P3, Third Grade Vet	Early Majority
P4, Fourth Grade Vet	Laggard
P5, Fourth Grade New	Late Majority

P6, Fifth Grade Vet

Late Majority

There was reoccurring theme of being hesitant, yet eager, to use educational technology. P1, Second Grade Veteran, and P2, Second Grade New, both can be categorized as “Early Adopters,” based on LaMorte’s (2022) definition. Both teachers claimed they were intrigued and open to experimenting and pointed out that technology can bring creativity to lesson planning and interactive activities. P3, Third Grade Veteran can be defined as “Early Majority.” Early Majority innovators want to see the innovation evidence before they’re willing to adopt or reject (LaMorte, 2022). P3 learned the technology quickly, but would like to see more pencil, paper, and physical learning, rather than digital.

P6, Fifth Grade Veteran can be identified as “Late Majority,” according to LaMorte (2022). P6 emphasized that they were feeling eager to learn the technology, but hesitant because when it doesn’t work, it’s very frustrating. P5, Fourth Grade New also falls under the “Late Majority” category as they were hesitant but quickly learned the ropes of technology. P4, Fourth Grade Veteran can be defined as the Laggard, because they were “very hesitant and scared to death.” P4 misses the simplicity of the low technology world but has gained an appreciation to know technology brings efficiency and saves resources.

Support

All the participants raved about how well teachers support one another in the school district. Support was defined on how the interviewees interpreted the question, some spoke overall in regard to support, others focused on technology support. “The second grade team, they’re awesome” (P2, Second Grade New). P3, Third Grade Veteran stressed how important it is to be on a good team. They mentioned that their team is constantly collaborating, creating lesson plans, and stated, “They’re [teachers] basically your family.” P4, Fourth Grade Veteran,

emphasized teacher support: almost all the time, they will go next door and ask their colleagues for assistance.

Some spoke about administration support. Administration really does want to help, but with behavioral issues happening, they're unavailable. Admin has people from curriculum software companies to come in and assist, which has been somewhat helpful.

Role of the Teacher – Elementary to Present Day

Many of the teachers interviewed did not have or had very limited technology when they were in elementary school. Many of the veteran teachers had little to no educational technology, the most being a television or one computer that was shared throughout the school. For example, P3, Third Grade Veteran talked about how their elementary school had AR points and could only take the reading tests in the computer lab. AR, Accelerated Reader, is a program most schools use to track students' independent reading practice and skills (Rosen, n.d.). P4, Fourth Grade Veteran had a Mac in the library and only if students finished their work could they play on it. "It did not contribute to our day-to-day instruction like it does now" (P4, Fourth Grade Veteran).

P2, Second Grade New explained how there is more pressure with today's educators: "There is a stigma of technology because we don't go a day without it here." When P2 was in elementary school, their third grade teacher still used her chalkboard and a DVD player to listen to music. With technology being integrated into children's lives, they "lose their noodles" when it's not part of the routine (P2, Second Grade New).

P6, Fifth Grade Veteran brought up interesting points. P6 mentioned that not only has technology changed, but also the role of the teacher. Educators today are now wearing many hats: being a counselor, a parent, a mother or father figure, instructor for technology, etc. These factors can contribute to burnout in present-day teachers.

Ed Tech Improvement (Support, Training, Tech)

Most of the participants want to learn more about technology. Many of them had to teach themselves the curriculum software and be brave to experiment and play with it. However, a few of them mentioned that learning from one another, learning from their peers, using each other as a resource, has been helpful. P2, Second Grade New quoted, “There’s so many things in education that we all wish we could be a little more educated and trained on.” P2 also mentioned having a trainer come in and dedicate a day for walking through software and curriculum with the teachers or having a veteran teacher who knows the ropes of ed tech to teach their colleagues could greatly improve the training experience.

Funding and durability were mentioned by P4, Fourth Grade Veteran:

I think more funding, which what couldn’t benefit from more funding? Better quality. I don’t even want to say better quality, just more durable. The wear and tear on the day-to-day, that also comes from the age of students, and the sense of responsibility. Definitely more funding to keep it [tech] timely because it ages so fast.

P1, Second Grade Veteran wish there was a tech person at each site in the district to come in when issues arise, which this can be an issue related to funding. At P1’s old school, there was a person who came in when problems popped up, assessing right then and there: “SES (socioeconomic status) is really low in [town] which could result in more help.”

Overall, all the interviewees would love to see more in-depth training over the curriculum software and technological devices to further emphasize their lessons and instructions.

Important Factors to Implementation

“It’s real life application” (P1, Second Grade Veteran).

Table 4.

Important Factors in Ed Tech Integration

Factors

- Clear expectations
 - Real life application
 - Responsibility
 - Engagement
 - Students' online activity and internet safety
 - Is it beneficial?
 - Teacher knowledge
 - Ability to pivot to pencil and paper
 - Efficiency
-

Many teachers expressed that the most important thing about implementing educational technology in classrooms is making it engaging. With engagement being the most important, so is the teachers' feeling of responsibility and internet safety, which leads to monitoring the students' online activity. P4, Fourth Grade Veteran, raised awareness to internet safety and responsibility:

For all the good technology and the internet and computers have brought us, it's a scary world when it goes awry, and so internet safety and efficiency of use are super important to me.

Many interviewees said that sometimes it's important to just read a book aloud on the screen - to listen to someone else that's not the teacher - and have the ability to pivot to pencil and paper when things go astray. P3, Third Grade Veteran mentioned that the new generation hates pencil and paper, so it's critical to implement fun activities that the students can do through their technology devices. "I think just the differentiation and keeping them engaged, whether

that's getting up and having a brain break and using the screen as a visual" (P2, Second Grade New).

One interviewee mentioned real life application, which can be led back to the learning theory constructivism. One of the principles of this theory is learning in real life and difficult environments. Realistic learning can help the students prepare for life outside of school, applying life-like situations to the classroom. This can also help with the infamous questions, "When will we use this in real life?"

Trainings for Educational Technology (RQ2)

The second research question asks about the educators' training experience with ed tech. This touches on if they've received training - and if so, how in-depth? - improvements with training, as well as how the teachers had to educate themselves and lean on one another for assistance.

Training for Ed Tech

Many of the participants said that they've received little to no training in educational technology, mostly teaching themselves and relying on their peers for help. A few teachers did mention companies from their curriculum software coming in and showing them the basics of the platforms. Unfortunately, when companies do come in to train the teachers, the training is not as in-depth as they'd like, and it's overall not "super helpful." "There's still a lot left to a teacher's own device" (P4, Fourth Grade Veteran). However, it seemed like most training came from learning from each other, "playing around with it," and "YouTubing" it.

As educational technology is rapidly gaining traction, many new teachers could be learning more about platforms and software to implement in their future classrooms, than veteran

teachers who must rely on companies and their younger peers. Some veteran teachers stated that “a lot of its self-taught or being brave enough to experiment” (P4, Fourth Grade Veteran).

Training Improvement

Table 5.

Training Suggestions Based on Participants' Responses

Training Suggestions

-
- Every few years
 - Company coming in, having full training day
 - One trained teacher instructing new teachers
 - Reaching out to reps
 - Spread training out
 - Every nine weeks
 - More interactive and hands-on
 - Tech person in each room
-

Many of the teachers interviewed had their fair share of training experiences, as well as suggestions for future guidance, as shown above in Figure 3. A few mentioned required trainings every few years, or even as often as every nine weeks. Two teachers touched on training being more interactive, having the teachers follow along on their own devices, and incorporating a Q&A at the end. This will give the chance for educators to ask important questions and to receive an answer right then and there, rather than waiting for an email, a phone call, etc. P1, Second Grade Veteran shared:

The most training I got is when they came into my classroom and helped me in my classroom. If we had more of that, I think that would be your biggest impact on training with technology.

With a more interactive training session, this means that the trainers need to implement cognitivism learning theory into their practices. This learning theory focuses on the memorization and strategies of learning. Although it's memory, being hands-on and interactive can help educators remember the platform uses, as many people learn in different ways (auditory, visual, experimental).

Other interviewees spoke about technology people from the software and curriculum companies coming in to properly guide and educate them on their platforms. Some programs are easier than others to learn (P3, Third Grade Veteran). Reflex, an "adaptive and game-based system guides grades 2+ students at every level to math fact fluency and confidence," (Reflex, n.d.) is simple, while others like Wonders, "an evidence-based K–5 ELA program that empowers students to take an active role in learning and exploration," (McGraw Hill, n.d.) the school's reading curriculum, is hard.

Positive and Negative Impacts for Teachers (RQ3)

The third research question dives into the positive and negatives of educational technology. This can include what devices are successful or unsuccessful for teachers and what they would change in their overall experience.

Successful Ed Tech

That's just the new way of life. They have to be able to use technology or they can't function in the world (P1).

There are many programs the teachers mentioned that have been successful: Reflex, Freckle Reading, Lalilo, and Prodigy.

Reflex, the online math program is described as a math fluency program. The platform individualizes math problems for each student and allows them to work on their needs without the teacher. The program targets individual students, so they don't have to wait for a grade from the teacher to move on to the next skill. Reflex offers a processing test, where each child has a specific amount of time to complete their lesson, which means not every child is on the same amount of time, being able to go at their own pace.

Prodigy, another math fluency platform, is used by many teachers in the district. "With Prodigy, kids practice standards-aligned skills in Math and English as they play our fun, adaptive learning games. All with teacher and parent tools to support their learning in class and at home" (Prodigy, n.d.). Similar to Reflex, teachers can track student development and choose where to spend their extra time on lessons.

Freckle Reading is "designed to be both student-paced and teacher-led" (Renaissance, n.d.). Freckle adapts to students' needs in ELA activities, which allows teachers to spend less time manually working on lessons and more time assisting students' development and progress, similar to Reflex.

Whereas Lalilo focuses on phonics, letter and word recognition, comprehension and fluency, vocabulary, writing, and social literacy. "Students journey through different worlds, collecting badges and unlocking stories. The vocabulary-rich stories teach students about nature and animals in engaging and fun ways" (Renaissance, n.d.). Teachers can also track the class as a whole and can assign specific lessons.

Another platform that is successful is Kahoot. Kahoot is an online website that students can use to learn through gamification (Kahoot, n.d.). Lessons can become interactive experiences that encourage learners to actively engage by participating in challenges, rewards, and competition. Kahoot uses behaviorism, as an example from this learning theory is game-based learning.

P1 raved about an application called Seesaw they used at their old school. “Seesaw brings together premium instructional tools and curriculum, inclusive two-way communication, deep learning insights and progress monitoring” (Seesaw, n.d.). Other features on Seesaw include multimodal tools, a learning journal, tools to connect the learning loop, auto-graded formative assessments, offline learning, easy differentiation, and transformative instructional tools (Seesaw, n.d.).

Another successful device or software is iPads. P2 and P3 specified the importance of iPads usability. P2 quoted:

I feel like iPads are easier for them [students], because they are touchscreen. When we’re doing interactive things, when we’re doing Google Classroom [on Chromebook], and they gotta get on their Google Classroom and type in this code for what we’re doing, it takes forever. They’re not used to typing. They haven’t been taught how to type. I would say iPads are much easier for these kids to use.

P3 added:

I feel like Chromebooks are a lot harder than iPads. iPads at my old school were super easy for the kids to maneuver and it’s much easier to do things when you’re doing it with your fingers, but I also think it’s good for the kids to learn how to type as well.

Specific devices that the *teachers* use for their own work include the Surface Pro, the Smart Board, and copy machines. The Surface Pro seemed to be reliable, but one complaint was that it's very sensitive. When it came to the digital camera innovation and the Smart Board, P4 "drug" their "feet like none other" and "left it [digital camera] in the box one year." The copy machines used at this local elementary school are connected to the internet, which means as the Wi-Fi and internet go down, not only do the devices no longer work, but so do the copy machines – which are desperately needed when teachers need to switch to physical copies in a moment's notice.

A few teachers emphasized that the Smart Board gives students the opportunity to follow along with their teacher, which serves as a visual for different lessons and activities. Both fourth grade teachers stressed that educational technology has greatly improved engagement and visualization. "It makes it more interactive, rather than just having to follow along in the workbooks" (P5, Fourth Grade New).

Negative Impacts on Ed Tech

Many of the interviewees agreed that when the Wi-Fi and internet disconnect and when devices' batteries die, nothing is helpful, and they must pivot quickly to paper and pencil to ensure their lesson continues. When these unfortunate events happen, educators have to change their lesson, all while trying to keep the class engaged.

Three of the veteran teachers had different takes on when educational technology wasn't successful. P1 emphasized that technology takes away the connection in the brain:

There's scientific proof that when you write, it makes connections in the brain. I mean, we're taking state tests on computers now. Everything goes to technology, so I think

we're missing that aspect of just the actual handwriting and the connection it makes in the brain.

P3 made the point of children being addicted to technology:

Nowadays, kids are addicted to technology. I'm trying to pull them away from it and go back to paper pencil. They don't want to do that; they just want to be on the computer all the time.

P6 mentioned that when they don't have technology, that's when ed tech is "unsuccessful." P6 went from TV boards, smart touch and pen, to the Smart Board, but unfortunately, it's "wonky," which can mean the Smart Boards can be askew and off-center, constantly needing recalibration. Overall, the educators emphasized that technology is a great tool, however, when it doesn't function correctly, it's frustrating.

Change in Experience

Table 6.

What Would You Change?

Changes

-
- More physical copies
 - Not to have technology
 - Reading and writing implementation
 - Devoting time to understand ins/outs
 - Finding effective ways to integrate
 - Gather resources during college
-

All participants had different views on what they would change in regard to educational technology. Some responses included feeling like the students are on the devices too much, going back to college and collecting resources regarding ed tech, devoting time to understanding the ins and outs, and pulling away from technology (and not even having it overall). These answers all connect in a way as it's critical to take these into account when it's time to effectively implement educational technology.

One answer that stood out was P6 Fifth Grade Veteran. They would like to see reading and writing implemented with educational technology. The two subjects connect with each other, and if students cannot read or write, they will never be able to utilize technology to its full advantage.

Another unique, yet expected, response was P5 Fourth Grade New. P5 emphasized that "technology isn't going away," and that "we've got to learn it and we've got to adapt to it." They also mentioned that teachers need to find effective ways to integrate ed tech into their classroom without it *becoming* the teacher. P5 mentioned a TedTalk by Rita Pierson. Pierson quoted, "Kids don't learn from people they don't like" (TedTalk, 2013, 0:01:37). Following Pierson's quote, and touching on Artificial Intelligence, P5 said:

There's something so personal about the teacher role that there are aspects of the job that, yes, I think AI could take over, but forming connections with your students, that is a huge part of it, and AI is never going to be able to do that.

Overall, all interviewees had their opinions on what they would change, and if they could go back to the past to gather proper resources, they would. P3's take on pulling away from technology, eventually wanting it gone from classrooms, is something that can be reviewed and investigated for further research as technology is quickly taking over lives and being integrated

in every way. As P5 mentioned, technology isn't leaving and we, as a society, need to learn to adapt.

Chapter V: Discussion

This thesis set out to address current gaps in technology integration by understanding teachers' experiences with ed tech. The researcher conducted qualitative, semi-structured interviews with six elementary teachers to help gain a better understanding of their ed tech background, training, and the positive and negative impacts of ed tech. The interviewees ranged across four grades (second through fifth) at a local elementary school in Oklahoma, with four veterans and two new educators. The responses from the participants can greatly help future researchers and educational technologists understand the issues in ed tech integration. There was a consistency of responses by the veteran teachers, as well as the newer educators. It can also guide school district administrators on how to be more effective in their support, professional development training for technology, and other aspects that are responsible for teacher's attitudes.

The reason for in-depth interviews was to gather their personal experiences and give the teachers a voice. Coming from a communication background, the teachers saw the researcher as someone who is looking to help the future of educational technology, which allowed them to be more open and responsive to the questions. Qualitative method allows researchers to gather information in a literary form (Creswell, 2013), giving the study a more narrative structure. With this method, the researcher was able to enter the education world and see things from the educators' perspectives.

Experiences of Educational Technology

Diffusion of Innovation in Ed Tech. Half of the participants were categorized as Early Adopter, according to LaMorte's (2022) definitions regarding diffusion of innovation. Two were labeled Late Majority and the last one was defined as a Laggard. These definitions fit the

educators' responses well. For example, P4 Fourth Grade Veteran talked on how they were very hesitant and kept their technology tools in a box for a year. A Laggard is defined as those who are committed to tradition and are leery to change, which makes them the hardest category to persuade (LaMorte, 2022).

Being a Laggard is neither good nor bad. There always needs to be someone who's skeptical, as it's important to question new inventions. However, Laggards refuse to leave their comfort zone (Varella-Cid, n.d.). This specific category only adopts innovations when it's necessary or when there's no other option. It's a position that can cost time and money. If the school district has already purchased technology devices and have scheduled training days, but a teacher's refusal to use the ed tech resources only delays the integration of the technology.

Falling into the adopter categories can be based on the teacher's previous experience with ed tech, whether it was from studying in college or past working experience at other districts. Another reason why educators can fall into different adopter categories is their communication channels, which is part of Rogers (1983) four main elements to the theory's framework. The communication channel is how an innovation is taught to specific groups or individuals. Based on the interviewees' responses, many are learning from their colleagues and peers, with little coming from the ed tech companies. The general speed of diffusion is how much time is needed to *diffuse* the product. Here, the product is educational technology. P4 Fourth Grade Veteran wished they had "more time" to fully understand the ins and outs of ed tech. This can play a role in training and professional development days, which trainers and admin intentionally giving educators time to fully comprehend *why* they need to use ed tech and *how* they can integrate it into their lessons.

Support. Many of the educators had great things to say about support from one another. Regarding administration support, and based on participants' responses, it can be better. Administrators do handle many things across their respective school districts, which can lead to teachers being on the backend. The number of admin has grown 87.6% between 2000 and 2019, while only 7.6% is student growth and 8.7% is teacher growth (Wigfall, 2022). Dr Arnn states that these numbers show the role of public education plays in the administrative system, with a rapid growth of admin removing "authority and money away from the schools where students learn" and instead it's "flowing toward the bureaucracy" (Wigfall, 2022). This shows that there is more administrative staff than teachers in many U.S. school districts, which can be a result of poor support for their teachers.

Bitner and Bitner (2002) emphasized how support from admin is critical for teacher success with educational technology. Support brings motivation and climate: motivation from admin and peers and the climate being the classroom and school environment. As David and Weinstein (2023) stated, educators' motivation styles in their classroom are important. If teachers don't feel support from their higher-ups, then motivation won't be present, and the climate will feel shaky, especially in the classroom. This can affect the students' learning process.

Stoya (2019) writes, "Administrators can improve responsiveness by acting immediately and delegating when feasible." Responsiveness can also be related to support. It's important for admin to "be visible" (Stoya, 2019). Some things administrators can do are to attend events, praise what they see, walk around and greet students, staff, and parents, and enter classrooms as often as possible. With this, teachers may feel that motivation and support, which can greatly improve their classroom environment when they see that admin cares.

Knowledge Gap. Curtis (2020) stated that there is an impending gap between available technology and teachers' use for it in their lessons. Demands of the digital age are slowly being met by educators. There are many factors that play into why a teacher may not want to implement technology into their classroom: time, knowledge, beliefs, and the willingness to change their pedagogical approaches (Curtis, 2020). Fear, resistance, stress, and anxiety are also among the different aspects of integration. One participant said they refused to use their digital camera for a year, which can be a sign of fear and resistance. Veteran teachers have the advantage of pivoting quickly to traditional learning, paper and pencil, because of their experience in the past versus present day. Veteran teachers can have a better connection of learning *with* technology and physical learning, meaning they know how to use technology for learning, rather than relying on it to get by. Newer teachers must navigate *how* to work *with* technology because they've grown up with devices and have not experienced a classroom without ed tech. Educational technology is bigger than tech itself as it's used to enhance learning experiences.

Positive Experience. Educational technology is a great tool, but when it doesn't work, it can lead to frustration. However, many of the interviewees have had positive experiences with ed tech. One educator mentioned how iPads are the best device. iPads are touch screen, allowing the students to interact with their device and be more hands-on. Unfortunately, iPads do not teach students typing skills, which is important as they grow older and enter the workforce.

College Experience. Preservice courses, student teachers in college, play an important role regarding learning educational technology and implementation. P2 Second Grade New mentioned how they wish they could go back and start collecting resources for their classroom, and that they learned the most about ed tech in their college classes. However, with veteran

teachers, those who did not have the opportunity to learn ed tech in college, must learn from their peers and colleagues. Many of the veteran participants said they learn from the younger teachers, as they are nearly fresh out of university, possessing the skills needed to work with ed tech.

Brenner and Brill (2016) mentioned that there needs to be technology courses for education majors, with faculty who are up to date with the latest tech trends and resources. This can greatly improve the future of ed tech and enhance new teachers' knowledge, so they can bring that experience to veteran teachers who are in need of ed tech assistance.

Ed Tech Improvement

Funding. An issue brought up was funding. Socioeconomic status (SES) plays a huge role in educational technology resources, especially when it can help better students' learning experiences. At a previous school, P1 mentioned that there was a tech person at each site and assisted in every classroom when a technological problem arose. Based on the 2021-2022 school year, Oklahoma rural schools received \$1.7 billion (\$2,477 in federal funds per student) (USA Facts, 2024). P1's previous school received \$3,400 in federal funds per student in their K-12 district, compared to the current school district, which is \$1,300 per student (USA Facts, 2024). It also depends on where the school is putting the funds. It's critical that schools put money towards technology tools for their teachers because tech is aging fast, and the software and devices purchased from five years ago may not suffice for present day learning.

Ed Tech Factors. Factors that play into educational technology improvement include clear expectations, efficiency and responsibility, internet safety, the ability to pivot to traditional learning, and the teachers' knowledge of the tech. Having the option of including technology in lessons is important. The ability to differentiate instruction, from a device to a physical copy of a paper or book, is crucial to learning and can help facilitate the different needs of students. Using

technology for everything will lead the students to addiction, mentioned by P3 Third Grade Veteran.

Screen addiction among the younger generation is an increasing issue. Technology addiction can lead to health problems (Liu et al., 2021), such as brain development, social anxiety, sleep disturbances, and other psychological health issues, as well as physical health problems like obesity, cardiovascular issues, and unhealthy dietary patterns (Tamana et al., 2019). Research has suggested that the earlier and longer the exposure to electronic media, the bigger increase in risk of psychiatric symptoms, especially those with attention issues, hyperactivity, anxiety, and depression (Neophytou et al., 2019). Even educational media can have poor outcomes regarding development in infants and children, hence why P3 was adamant about pulling their students away from ed tech to more traditional learning.

Learning Theories and Frameworks. Differentiating lessons can help the teacher use the different learning theories from Robinson et al (2007): behaviorism, cognitivism, and constructivism. These learning theories can help educators identify how to use their technology skills to integrate ed tech into their instructions and see how each child learns, which can also play into Universal Design for Learning. This framework can be used in the different learning theories mentioned above and to help educators diversify their lessons (CAST, 2024) to keep ed tech and paper and pencil learning.

Training

Overall. Many of the participants said that they receive little to no training. This can fall into administrative responsibility as they would be the ones to schedule and make sure their teachers are receiving adequate instruction from the appropriate software and learning

companies. Teachers are having to ask their peers for assistance and rely on outside training, such as YouTube and Google to further their technological knowledge.

Suggestions. Suggestions for better training implementation included spreading the training out, whether it's every few years because of tech aging out quickly, or even as often as every nine weeks. Educational technology training can be added into professional development days, which for this district is only five days out of the school year. With how fast technology evolves, it's best if training is every nine weeks. This can be a PD day dedicated to technology: reviewing, asking questions, seeing how other teachers use the platforms, etc. One suggestion was to make training more interactive. People learn in different ways (visual, auditory, kinesthetic); therefore, the software companies can add different activities and presentation styles to fit all learners. Trainers from the companies, even administrators, can utilize UDL for their ed tech training days. This way, all different learners, the teachers, have the opportunity to actively participate.

Limitations and Future Research

With all research studies, there are limitations. One limitation that occurred was during the interview process. There was a snow day, so in order to interview one educator, the researcher had to utilize Zoom, an online video platform. With unstable internet connection and spotty audio, the researcher had to type the questions into the chat feature for the interviewee. The interview turned more into a questionnaire, rather than a conversation.

Snowball sampling was utilized, but only within the specific elementary school, which can result in very similar answers and perspectives, which can be a strength in the study. Within this thesis, examining one education institution was a *strength* because of the consistency of

answers from the participants. The veteran teachers had coherence with their responses, while the new teachers also had similarity.

Since looking into one small public school was a strength for this study, prospective research can suggest that combining this thesis's qualitative data and future quantitative data can represent a broader population. However, this can only work if the future research does not lose sight of the in-depth qualitative data from this study: the numbers should support the story, not replace it.

Other future research can include reaching out to different school districts, interviewing different faculty, such as elective teachers (STEM, Technology, Art, etc.) and looking into different grades, like junior high and high school, as well as examining the difference of low SES and high SES districts. P6 Fifth Grade Veteran mentioned that not only has technology changed, but the role of a teacher. Teachers are "wearing" many different "hats," taking on parental roles, playing counselor, as well as being an instructor for technology, which these roles can lead to burnout. This can implicate future research for how well educators are balancing their work with their personal life, as well as exhaustion.

The learning theories, behaviorism, cognitivism, and constructivism can also be further investigated for future research. With behaviorism, researchers can examine the ways educators use operationalization, or operant conditions, such as game-based learning and drill and practice techniques. Researchers can also look at how cognitivism affects learners' memories. How are teachers organizing their learning content, so the students have a better chance at developing memorization strategies. The last learning theory researchers can look further into is constructivism. This theory examines the different principles: learning in life-like and difficult environments, implementation of social exchange within learning, supporting different

perspectives and the use of multiple representations, scaffolding ownership, and nurturing self-awareness of knowledge. Researchers can investigate the different learning environments students are in and that teachers are utilizing, as well as different perspectives the classroom holds.

Another idea for future research is looking into why there are more administrative roles than teachers. The Legislative Office of Fiscal Transparency (LOFT) has found that between 2016 and 2021, state budget spending on curriculum in Oklahoma City public schools increased only 3% while administration spending went up 41% (Carter, 2022). These statistics can grow worse in coming years, according to LOFT officials. “Put simply, the growth of administrative payroll has limited schools’ ability to hire more classroom teachers,” LOFT reported (Carter, 2022). Administration growing more than teachers greatly impacts their focus on their own educators. This can result in poor support for teachers as they are not a priority.

Chapter VI: Conclusion

This thesis sets out to find elementary teachers' experiences of new educational technology. The researcher defined educational technology as the tools and devices used to facilitate learning in elementary classrooms. However, ed tech is more than just a device: it can also be defined as the ethical practice of facilitating learning. Though, coming from a communication perspective, the researcher wanted to find how elementary teachers are using the technology to support student learning. The study used a qualitative, semi-structured interview with six elementary teachers from a local school district on the outskirts of Oklahoma City. Many of the findings matched past research studies, demonstrating a high degree of consistency. This provides valuable feedback to school districts and educational technologists on what they can do differently. The findings can also contribute to future research and exploring other avenues of education and technology.

Many of the educators gained their knowledge of technology by working with it as they go. Veteran teachers have relied on their younger colleagues and classroom neighbors for assistance and support, as the newer teachers have learned some ed tech in college courses. Other factors that contribute to ed tech experiences are support from administration, improvement, training and professional development, and positive and negative impacts for educators when using ed tech. While the participants had great insight for all ed tech factors, support, training, and tech improvement seemed to be the biggest issues overall.

Diffusion of innovation was the framework used in this research. The goal of using this theory was to see how the teachers differed in their thoughts about ed tech. The teachers were labeled using LaMorte's (2022) diffusion of innovation adopter categories. Examining the ways the teachers adopt and their feelings towards ed tech can greatly affect how they approach their classroom instruction. Those who use technology may be having a greater impact on student

attention, while those who are slow to adopt may struggle to capture students' focus. However, as P3 Third Grade Veteran mentioned, it's critical that teachers pull away from technology sometimes because of the digital addiction the younger generation is rapidly developing. Unfortunately, technology is here to stay and it's important that the education system learns to work *with* it, rather than having technology work *for* the students and teachers.

This research has implications for future studies. Other studies can focus on looking into different districts, possibly bigger schools and looking at elective teachers (STEM, Art, Technology, etc.), examining why teachers wear so many different hats (P6 Fifth Grade Veteran), work-life balance, and support from administration, specifically why there are more admin than there are teachers. Many of the findings can be found in the lack of administrative responsibility: training, support, overall improvement. Overall, this thesis gives insight into what administration and educational technologists can improve on their school site or of their devices and software. Teachers are the backbone of this country, and they need to receive the proper support and resources to facilitate students' learning.

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Appendix

Interview Guide

Please state the grade you teach and how long you've been teaching.

Starting with explaining the definition of educational technology:

Educational technology is about using tools and ideas to help people learn better. It involves designing and improving learning experiences in a way that helps learners succeed. Examples can include Smart Boards, laptops, learning software, tablets, etc.

1. Describe your experience with educational technology.
2. Can you tell me a time when educational technology was helpful for you and your students?
3. Describe a time where technology wasn't successful in the classroom.
4. Can you elaborate on the training you receive to successfully integrate educational technology in your classrooms or lesson plan?
5. What can be improved with training that you think can help the success of implementing technology into classrooms?
6. Is there an experience that stands out with a specific technology device that was successful or unsuccessful?
7. What's the most important thing about implementing technology into educational settings?
 - a. Why is it important?
 - b. If you could pick the most important thing, what would it be?
8. Describe the support you receive from other teachers or administration.
 - a. OR have you received support from other teachers or administration?

9. What do you think can be improved with educational technology? Whether it's support from higher-ups, training, or the technology itself.
10. Think back to when you were a kid in elementary school, how do you think the role of a teacher has changed in regard to technology?
11. What is one thing you would change overall in your technology experience being a teacher?
12. Is there anything you'd like to add?

Added before very first interview:

13. What was your thought process when you were first introduced to ed tech?
 - a. Were you eager or hesitant?