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Impact of technology in the classroom

Olivia A. Erickson
Bethel University

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Olivia Erickson

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Thesis Advisor: Nathan Elliott, M.A.

Program Director: Lisa Silmser, Ed.D.

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Abstract

The integration of technology in the classroom has revolutionized education, providing both opportunities and challenges. Technology has introduced innovative tools and resources that facilitate personalized and interactive learning experiences. The incorporation of technological devices, such as tablets, laptops, and interactive whiteboards, has enabled educators to deliver dynamic and engaging lessons. Students now have access to information, enabling them to explore diverse subjects, topics, and perspectives. Additionally, educational software, online platforms, and multimedia resources have transformed classrooms into flexible learning environments for individual learning styles and promoted active participation. The integration of technology in the classroom has also fostered the development of critical thinking and problem-solving skills among students. Collaborative platforms and communication tools have empowered students to engage in real-time discussions, share ideas, and collaborate with peers. While technology can be beneficial, there are also challenges. The proper integration of technology requires training and support for educators, ensuring they can effectively utilize these tools to enhance learning experiences. In conclusion, the impact of technology in the classroom has significantly transformed education, offering learning opportunities for both students and educators.

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CHAPTER I: INTRODUCTION

Context

Technology is a major topic used and explored in education. Over the past several decades, technology has increased rapidly. From computer labs to individual devices, technology is constantly changing. Technological advancements have provided educators with tools and resources to enhance the educational experience of their students. They use interactive whiteboards, educational software, and other online learning platforms that enable teachers to teach engaging lessons. In recent events like Covid-19, barriers have been broken and are providing opportunities for remote (distance) learning. The future of education holds the potential for even more exciting possibilities, as well as personalized learning experiences and educational environments. As technology in education continues to rise, its integration into education remains crucial, as it will empower learners and educators to gain skills, knowledge and confidence in our technology-rich world.

Educators recognize that integrating technology is an important aspect of the modern classroom. They view it as an essential tool that enriches and enhances the learning experience for students. Technology integration enables educators to create interactive lessons that foster engagement, active participation, and student motivation. With the numerous amount of digital resources available to educators and students, such as educational websites, apps, and interactive software, educators can provide personalized instruction, creating a student-centered learning environment that students will thrive in. Educators understand that technology is not a substitute for effective

teaching but rather a tool and resource that extends their instructional practices. They believe that technology integration equips students with the digital literacy skills necessary for success in the 21st century. Educators view technology integration as a gateway for innovation, creativity, and lifelong learning.

Theoretical Framework

Understanding the impact of technology in elementary classrooms is crucial in today's educational realm. An educator's perspectives and beliefs about their experience, knowledge, and confidence impact how they integrate technology into the classroom. This then impacts their student's engagement and motivation. To best understand the impact of technology integration in elementary classrooms, it is essential to be informed of the contributing factors. These factors include how technology is integrated into elementary classrooms, the perspectives educators have toward technology integration, and the impact technology integration has on elementary students. By understanding technology integration, educators can make informed decisions about the tools and resources for their students while preparing them for the technology-driven society.

There are numerous theories that technology in education is beneficial to students no matter what age or learning level they are at. How technology is incorporated into the classroom is based on the devices within schools and which programs and software are available for use. Many educators use technology to present instructional information to students in whole groups, small groups, and individual settings. With the rise in technology, many schools are able to provide students and educators with 1:1 technology. Students are able to gain more skills and knowledge with more access to technology.

There are also many uses for technology in an elementary setting. There are also many software programs students can use to explore and showcase their learning.

Theories regarding the perspective teachers have toward integrating technology, many sources believe that technology is a great tool and resource in their classroom. Data were collected through various surveys and observations. The data showed that a small percentage of educators felt confident in their ability to teach and use technology. More than half of the educators who participated in surveys, interviews, and observations felt that they had a general understanding of technology use but felt that they needed additional training. It was often noted that educators felt they were not adequately prepared in their undergraduate programs. With the rapid rate that technology is moving in education, others felt that they could not keep up with the new changes. Research recommends that professional development and learning opportunities should be provided for educators to help increase their skills, knowledge, and confidence with the use and integration of technology.

Integrating technology into elementary classrooms has both positive and negative effects on students. Positive benefits of technology integration include providing students with learning opportunities, engagement, and motivation, personalized learning experiences, improving their collaboration and communication skills with their peers, and developing technical skills to thrive in a technology-rich world. Negative impacts of technology integration include that technology can be a distraction for young students and should be introduced into the classroom in middle school (McDermott and Gormley, 2016). Students can become too reliant on technology and struggle with other skills like

handwriting, spelling, and grammar. Students need to be taught how to properly use technology and view the technology as a resource tool, not a toy. When used properly, students benefit from technology being used in the classroom.

Rationale

With technology still on the rise, it is crucial that educators know how to use and integrate technology in the classroom. Throughout the research, more than half of educators felt that they were not well equipped to be using, let alone teaching, technology. There are numerous ways that educators can integrate and use technology in the classroom. Teaching educators how to use technology will build their skills, knowledge, and confidence, which will benefit their students' learning experience. Providing educators with opportunities to learn how to use and integrate technology is an important step. Professional development and learning opportunities should be provided for educators to attend to better their confidence. The more confident an educator is with their use of technology and integration affects how it is used in the classroom. Students should be using technology in the classroom to gain their own skills, knowledge, and confidence to thrive in our technology-rich society.

Definition of Terms

The online dictionary definition of (integrate) integration is to bring together or incorporate (parts) into a whole. Secondly, it is defined as a way to make up, combine, or complete to produce a whole or a larger unit, as parts do (dictionary.com). In this literature review, the term integration is a verb used to mean to bring together or incorporate (parts) into a whole.

According to Renton Prep, the definition of student-centered is a teaching method that focuses on creating connections with students' interests and the things they learn in school. The ultimate goal is to make the educational process more meaningful to students. In this literature review, the term student-centered is used to mean a method of teaching that shifts the focus of instruction from the teacher to the student (wikipedia.com).

Research Focus

There are several approaches I took to narrow the focus of technology's impact in elementary classrooms. I started by asking three questions. First, how do elementary teachers integrate technology into their classrooms? Second, what perspectives do educators have toward the use of technology in elementary classrooms? Third, How does implementing technology into elementary classrooms impact student engagement and motivation? I spent time researching the three questions to gain knowledge, information, and answers to my questions and find common conclusions.

Second, I used keywords to help guide my research to find relevant information and studies. The most common key terms I used included "technology integration" "teacher/educator perspectives toward technology integration," and "impact of technology on elementary students."

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

To locate the literature for this thesis, searches of Educational Journals, ERIC, Google Scholar, and EBSCO MegaFILE were conducted for publications from 2000-2021. This list was narrowed by only reviewing published empirical studies from peer-reviewed journals that focused on technology, perspectives of educators, and the effects of technology on elementary students that addressed the guiding questions. The keywords that were used in these searches included "technology in elementary classrooms," "elementary teacher's perspectives of technology use in the classroom," "uses of technology in elementary classrooms," "technology integration in elementary classrooms," and "impact of technology on elementary students." The structure of this chapter is to review the literature on technology in elementary classrooms in three sections in this order: How Technology is Used in the Classroom, Perspectives of Technology in the Classroom; and the Effects of Technology on Elementary Students.

How is Technology Integrated into Elementary Classrooms?

Many technological devices and applications are used in elementary classrooms, including iPads, Chromebooks, tablets, and laptops. Each technology device has specific uses, characteristics, and applications that determine how the device can be used. For example, Google Slides, Google Docs, and Google Classroom. In contrast, other devices may have Microsoft and Windows applications. There are numerous avenues that educators can take to aid in using the devices and applications to create a student-centered classroom and learning environment for students. Each of these devices

and applications has steps for implementation. It cannot be expected or assumed that educators or students can successfully use a device or application without the proper steps and training.

Mills and Tincher (2003) believe there are five stages of technology integration. These five stages are entry, adoption, adaptation, appropriation, and invention. Each step builds on the next for a successful implementation. Mills and Tichner (2003) summarize the entry-level use of instructional and text-based materials for teacher-directed activities; adoption is used for technical purposes such as keyboarding and additional technology software; adaption is used as a way for the technology to start being used in classroom practices and computer-assisted instruction; appropriation is when the educators are beginning to see and understand the many benefits and uses of the technology and can implement project-based learning; and the invention is the final stage where the knowledge becomes more student-centered. When completing their study on developing a model that evaluates technology integration in the classroom, their goal was to evaluate the effectiveness of initiating technology-related professional developments by incorporating standards and the five stages (listed above) and then assess the teachers' progress in each step. Mills and Tincher (2003) organized 18 standards into three skill sets. It was first using technology as a tool for professional productivity. Secondly, facilitating and delivering instruction using technology. Third, integrating technology into student learning. The three phases were intended to identify several instructional strategies to represent how the technology was being integrated into the classroom and enhance student learning. The rubric used in this study is called the Technology

Implementation Standards Configuration Matrix (TISCM). Mills and Tincher (2003) noted that 70 teachers completed this checklist at the beginning, 78 at the end of the year, and 46 educators completed the rubric at the beginning and end of the year. The data showed that the TISCM checklist was an effective tool for technology integration. Mills and Tincher (2003) shared that the TISCM confirmed their thoughts on integrating technology in a developmental process and supported their view that newer teachers are using technology as a tool.

The study conducted by Varier et al. (2017) aimed to understand how teachers and students have used different technology devices in the classrooms and various school settings. In this large, suburban school district, eighteen classrooms participated in testing the various devices over three months. Varier et al. (2017) wanted to find which of the six devices used in the study was most appropriate for meeting the district's goals in a 21st-century learning environment. The devices used in the study consisted of Dell laptops, iPad Minis, Nexus 7, Kindle Fire, Chromebooks, and Windows tablets. When focusing on technology integration, several teachers noted that upon initial integration, there were some difficulties due to having access to the district's wireless network. It was suggested that the Dell Laptop would serve middle and high school students better than elementary students for those reasons. Users mentioned that the Windows Tablet and the iPad Mini were better for district use but were not a great fit as the devices had many obstacles. Varier et al. (2017) discovered a limited understanding of the potential of technological devices. Although it has been suggested that 1:1 device usage led to self-directed learning, and improved motivation, engagement, and achievement for

students, Varier et al. (2017) found that participants recommended 1:1 technology access regardless of which device they used. Some devices are better for specific tasks than others. The findings suggested that the technology only provides a set answer if 1:1 is better than 1:1.

Shively (2014) wanted to study the progressive learning environments where elementary students can participate and observe how children engage with digital media and how students engage in an interest-driven project that each student created with multiple digital programs and technology access. Students who attended the Saturday Studio: Digital Design and Creative Exploration were provided with hands-on learning opportunities. In the program, there was numerous software that students could explore. The software options included animation software, video editing software, photo editing programs, game design platforms, and other design programs. In addition, the students had access to different art materials and Legos to aid in their learning of creating digital artifacts. Students demonstrated that, through self-driven projects, they were able to develop techniques and skills in using technology. Shively (2014) shared that children had to play, work, and learn simultaneously to progress their projects. The study's results focused on two of the ten participants; Jack (7) and Delany (8). Jack had an interest in computer programming. Jack wanted to create his own video game when he started his project. While making a video game, he realized it was more challenging than expected. His excitement kept him motivated to continue developing and designing his video game. Jack's process for the project included the back and forth of playing his video game and making the necessary changes. He discovered many other components programmed into

his game through his work. For example, he makes costume changes for his characters. Even when a facilitator would interview Jack about his project, he would start critiquing his work. He could process it while he thought about and discussed the project he created. Delany was interested in digital design. Like Jack, she also aimed to make her own video game based on her experience and knowledge of playing video games. Throughout her exploration, she was able to make several animations. Throughout her work, she discovered how to incorporate voice recordings. This interested her, so her goal to make a video game switched to having an interest in wanting to make a short skit. She remained interested in creating a short skit that she would find ways to incorporate any noises she could. A facilitator noted that Delany would want to stay and work on her project and appeared to enjoy her time. As she shared her skit, he was able to observe and identify areas where she could improve her work. One of her methods was to talk out loud. In total, Delany made six animation projects. Shivley (2014) stated that all ten participants could self-manage their projects. The students were able to develop techniques throughout their time with Saturday Studios. Several methods included playing, editing, and moving. Shively (2014) mentioned that there was some difficulty in determining if students were playing or working. The research showed that when students could choose a project based on their interests, they were focused on creating a project that showed their learning.

Assistive technology is an additional implementation that needs to be reviewed. Peterson-Karlan (2015) wanted to explore how assistive technology is incorporated into public school classrooms. Incorporating assistive technology is vital to aid in the learning

of students who require an Individualized Education Plan (IEP). Peterson-Karlan (2015) defines assistive technology as "any item, piece of equipment or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (pg. 2). This is not specific to how the devices assist students who need accommodations. Assistive technology can help with physical and sensory functions, language and speech, executive functions, reading, and writing, among other factors. The first challenge was the convergence of technology. The pace at which assistive technology has a specific design and purpose is a common and constant challenge. Second, technology is quickly transforming, causing difficulties in gaining skills and knowledge of the devices. Third, many individuals struggle to change their thoughts and views on technology. Lastly, research on technology functions requires individuals to research the uses of specific devices. Peterson-Karlan (2015) mentions a lack of technology access for students with disabilities at preK-12 grade educational levels.

McDermott and Gormley (2016) wanted to study the claim that technology transforms teaching and student learning and engagement. Others argue that technology integration is oversold and does not improve teaching and learning. There were two focus questions throughout this study. First, how technology was used in elementary reading lessons. Second, what instructional patterns and themes appeared in reading lessons when technology was used McDermott and Gormley (2016) completed their study in a small northeastern city where two-hundred students attended. Roughly 85 percent of students were eligible for free and reduced lunch. It was noted that only 6.5 percent of students in

third through sixth grade passed the statewide tests in literacy. The school was selected based on the variety of technology in each classroom (smartboards, desktop computers, and web-based literacy programs). McDermott and Gormley (2016) focused on four elementary classroom teachers who consistently use technology with reading lessons in their classrooms. The principal selected four teachers who consistently used technology in their classrooms. These teachers were observed five different times by two researchers (for peer discussion), totaling twenty-five hours of observation. The researchers collected data by observation, conversation, and one planned interview with classroom teachers. McDermott and Gormley (2016) identified five different categories: multimedia displays, interactive, student attention, shared texts, and individual use. The most common use of the technology was to display multimedia content. The primary teachers used technology for interaction (physical involvement), where the intermediate grades used technology for reading groups or taking notes. McDermott and Gormley (2016) shared they noticed that technology was more of a distraction for the intermediate grades. The results of this study suggest that technology has many benefits and uses. The technology supported the teacher's instruction, and student learning improved.

Kemker et al. (2007) wanted to research how laptop computers were being integrated into elementary classrooms. Additionally, they wanted to observe classroom management approaches and an authentic learning environment. This study focused on 26 low-income students in a South Carolina Title 1 public school. A second factor in selecting this school to study was the school's flexible environment. In the findings of this research, the students who benefited the most from this research over two years were

those on a free and reduced lunch. The laptops stayed in the classroom for students to use when needed due to the administration thinking that younger students may have adults or older students take advantage of the technology if the devices went home. Kemker et al. (2007) observed that the school wanted to ensure that all students had access to authentic instruction. The work that students are doing in the elementary classroom is meant to prepare students to complete tasks they will experience outside of the classroom. The laptops allowed students to complete projects using various methods. These methods include spreadsheets, word-processing software, video editing tools, and graphic organizers. Several students created a movie using the video-editing software accessible on the laptop. Over the two years, it was observed that the student's technical skills enhanced, and the teacher gained confidence in the technology integration resulting in more usage. Kemker et al. (2007) also found that in those two years, the students who received free and reduced lunch benefited the most from laptop integration in the classroom. Mixed Methods were used to collect data. These methods include observations, lesson plans and student work assessments, and interviews with teachers and students. The results of this study for the classroom observations are that students learned how to use technology as a learning tool. Technology was integrated into the lesson as an extension of learning. The results of reviewing lesson plans and assessments of student work included the process and product of the lesson. Student interviews were conducted to gain data on students' experiences with using technology. Kemker et al. (2007) noted that, through student responses, they were able to identify that authentic instruction was taking place. Ultimately, identified the laptops as a learning tool. For the

teachers' interviews, the teachers recorded their reflections daily. The researchers and the teachers had weekly discussions to focus on lesson plans and technology integration. At the end of years one and two, the interviews were recorded for review and reflection. Kemker et al. (2007) were able to collect data that technology integration was providing authentic instruction for students.

Butzin (2001) completed a study that focused on the integration of Project CHILD (Computers Helping Instruction and Learning Development). Project CHILD is an instructional model for kindergarten through fifth-grade students with access to computers and hands-on learning stations. This study is incorporated through a clustered design of three; three teachers working with students across three grade levels (K-2 or 3-5) for three years. The subjects focused on included reading, writing, and math. The students were allowed one hour a day to use the computer. This study evaluates and determines how Project CHILD students compare to students in traditional classroom settings. The school that incorporated Project CHILD had 110-second graders (who started in kindergarten) and 94 fifth graders (who started in third grade). As a result, students who participated in Project CHILD had higher test scores compared to students who did not participate in Project CHILD. There were significant differences for the second graders in math. As for fifth-grade students, significant differences were found in reading comprehension, math computation, and application. These results support that Project CHILD had positive outcomes for student learning. Butzin (2001) shared that "most teachers still have difficulty integrating computers into the classroom instruction.

Only 43% of elementary teachers assign computer work frequently" (pg. 6). It was noted that Project CHILD was created to help overcome many of these barriers.

Cobb (2010) completed their research at the Cleveland Metropolitan School District. The Cleveland Metropolitan School District incorporated the program's Compass Learning Odyssey Reading software. This software was implemented to incorporate differentiated learning opportunities for listening and writing activities. When incorporating this program in kindergarten through eighth grade, the teacher received professional development training on the program to achieve and see the benefits the program had to offer. In this particular study, educators received monthly training with specific goals. Cobb (2010) shared that the professional development that was provided based their goals on the school's mission and vision. Cobb (2010) also shared that teachers in the Cleveland Metropolitan School District must pursue professional development programs, technology-supported. This requirement is one of many methods districts can use to help teachers gain the required skills and knowledge to teach students those skills needed successfully. In the professional development course, there were several activities and topics covered. Some examples include technology usage and integration, classroom management, enhancing the teaching process, using technology tools, and reaching out to community members. If educators want to continue training on the topics covered, the television station WVIZ/PBS provides teachers with resources and schedules for professional development opportunities. Cobb (2010) asked teachers to complete a fifteen-question, five-point survey. The data showed increased technology use from winter (23.58) and spring (26.18). There was an increase, but more was needed to

reach a difference. Even with professional development, there was only a 2.6% increase in technology-based software used in the classroom from the fall to the spring (pg. 5). Although this percentage is lower than expected, it shows some growth with technology use. Various factors can be beneficial or create setbacks for technology use. After completing the survey, Cobb (2010) found that teachers had an increase in their use of technology and internet-based software and showed an increase in their comfort levels when using technology in the classroom. In seven out of eleven areas, teachers preferred internet-based software. The results also showed that teachers who originally expressed discomfort using technology have become more comfortable due to discussions with other educators and professional development sessions. The survey results also showed that the use of technology remained steady from the fall to the spring. There was a high level of comfort in using the Compass Learning program. Teachers could make adjustments to differentiate instruction resulting in student achievement and success. Teachers can gain the confidence needed to implement the Compass Learning program by participating in professional development workshops.

Wilson et al. (2003) investigated how fifty educators and their students use computers in their elementary classrooms by taking surveys and participating in interviews. There was a mix of educators who taught in rural and suburban schools with various levels of socioeconomic status and diverse, multicultural backgrounds. Wilson et al. (2003) noted that 9.2 years was the average teaching experience of the fifty teachers. In total, three are 460 years of teaching experience when added together. In this particular study, when asked how much time was spent using technology in one week for classroom

purposes, forty-eight percent of teachers reported zero to one hour per week, twenty-eight percent reported one and a half to three hours, and twenty-four percent reported four to five hours of use per week. When asked how much time the computer was used outside of classroom purposes, twenty-eight percent reported around one hour, fifty-two percent reported two to three hours, and twenty percent reported four to six hours per week. The third question asked the amount of time students spent on the computer in a week. The results showed that fifty-six percent of students used technology within an hour, thirty-two percent of students used technology for two to three hours, and twelve percent of students used technology between four and five hours per week. The fourth question asked how the educator uses the internet for classroom purposes. Forty percent researched instructional material and lesson plans, twenty-six percent downloaded graphics, twelve percent looked for games, and four percent sent emails, allowing students to participate in research, chat rooms, and surfing the web. The fifth question asked how teachers used the computer for classroom purposes. Seventy-two percent recorded grades, forty-six percent created letters for parents, forty-two percent wrote lesson plans, twenty-four percent created tests, sixteen percent wrote worksheets, fourteen percent wrote newsletters, eight percent used PowerPoint, six percent made chairs, and four percent recorded attendance, digital field trips, presented content, created activities and review CDs. Question Six asked what software programs were installed on the teachers' hard drives. Ninety-two percent had Microsoft word; forty-eight percent had PowerPoint, thirty percent had Print Shop, twenty-eight percent had Microsoft Excel, twenty-six percent had a variety of CD games, sixteen percent had Microsoft Publisher,

eight percent STS grade book, six percent had Grade Keeper, and four percent had Kid Pix, Claris Works, and spreadsheets. Question seven asked what CD games and tutorial programs were used. Thirty-six percent used Accelerated Reader, thirty-two percent used Games in General, twenty-eight percent used Reader Rabbit, twenty-four percent used Math Blasters, sixteen percent used References or Encyclopedias, twelve percent used Spell Bound Phonics, Jump Start, Math (unspecified), Oregon Trail, and General Music, and twelve percent used a variety of content-related games. Question eight asked which computer programs and skills they were currently proficient in. Seventy-two percent reported searching the web, sixty-four percent reported using email, fifty-six percent reported proficiency in WORD, thirty-two percent reported PowerPoint, twenty-four percent reported downloading graphics, twenty percent could use spreadsheets, sixteen percent could use a scanner, and twenty percent could use Print Shop, making movies, and creating a web page. The ninth and final question asked what computer training the educator had completed. Twenty-four percent said coursework in their undergraduate program, twelve percent shared coursework in their graduate programs, sixty-eight percent through workshops, eight percent said they taught themselves, and eight percent from networking with others. Based on these results, the average hours teachers use the computer per week is 1.9. Those teachers primarily used the computer to record grades. Very few of the teachers used the computer to present materials, content, and information. 1.8 hours was the average use of the internet by teachers. Those teachers used the internet to research materials. The total amount of time elementary teachers used the computer and internet was 3.7 hours. The elementary students had an average computer use of 1.5

hours a week on the internet or using instructional CDs. All fifty teachers shared that the computer and internet were only used after all other tasks and assignments were completed. Wilson et al. (2003) hoped that teachers would integrate technology into the classroom. They shared that teachers need to be properly trained before asking teachers to integrate technology into the classroom. It was reported that educators still have lower expectations of technology, resulting in low technology use. Wilson et al. (2003) suggested that educators receive the required training for effective technology integration.

Webb (2011) researched how new classroom teachers' technology proficiency levels, attitudes toward technology, and integration of technology into curricula. Participants were first-year general education teachers. To complete this study, Webb (2011) compared prior technology experiences and attitudes of new elementary teachers with current practices of technology-integrated instruction. Two self-assessment surveys, Basic Technology Competencies for Educators Inventory (BTCEI) and the Technology Snapshot Survey (TSS), were completed by the participants to identify if there were comparisons between the data in the two surveys. Three focus questions were asked to find out the characteristics of technology-using teachers, the characteristics of non-technology-using teachers, and the extent of technology courses that were attended during the participant's pre-service experience. Of the sixty-nine participants, eighteen had a high use of technology in the classroom. Additionally, there was a range of one to three courses that were taken during the participant's pre-service experience. There were significant findings between the teacher's attitudes regarding technology use in the classroom, the number of courses the participants attended, and their proficiency levels. It

was important to note that the type of technology was not as important as the number of classes. These variables predicted whether or not technology was integrated by the new teachers. Webb (2011) shared that the number of courses relating to technology taken had some effect on technology integration and had a ninety-five percent confidence level. Attitudes correlated with integration and also had a ninety-five percent confidence level. The proficiency levels and integration of technology had a negative correlation and showed that there was no statistical significance at a ninety-five level of confidence. However, there was a positive correlation between attitudes and technology at a ninety-nine percent confidence level based on courses taken. After collecting data, Webb (2011) warned that the results of this research need to be interpreted through correlations. The inferences cannot be casually drawn. It can be argued that the number of technology courses the teacher took and the attitudes regarding technology were related to whether new teachers integrated technology. It cannot be argued that the variables are what teachers use to integrate technology into the classroom and instruction. Webb (2011) found that the findings suggest that teachers who have more technology proficiency are more likely to integrate technology in their first year. It was found that proficiency levels had the greatest impact on whether or not technology was integrated.

When it comes to integrating technology into a classroom, more is not always better. How technology is used to support learning makes a difference. When technology is seen as a tool, it is more likely to be incorporated into the classroom instead of as an extra resource for supplemental purposes. With technology, barriers are expected. Providing support for teachers to overcome those challenges by working with others or

receiving proper training to keep technology in the classroom. It can also be challenging to integrate technology when it is constantly changing. However, staying current on practices to help students learn and need is important to support students.

Perspectives on Technology Use and Integration in Elementary Classrooms

As technology continues to be present in almost every district, school, and classroom, educators have different thoughts about the use and purpose of technology in elementary classrooms. Several factors affect how teachers, educators, and districts see technology integrated into classrooms. Some of these factors include the rapidness of technology devices and development; the skills needed to use technology; what educators know about the technological device they were asked to use, and what educators' beliefs are about using technology, among additional factors. Most importantly, a teacher's attitudes and beliefs toward technology integration in the classroom impact whether technology will be integrated successfully into the classroom. What a teacher believes about technology usage will impact how educators will use technology in the classroom. If a teacher believes that technology integration will be successful and beneficial to students learning and engagement, it is more likely that technology will be a part of learning and instruction. Should a teacher be hesitant about technology integration and its success, technology will not be integrated to the extent sought in the ever-growing technology integration in the classroom. Educators want to feel confident in their ability to use and teach technology before incorporating it into the classroom. What educators believe, value and their comfort level with technology significantly impact technology integration in the classroom.

Ertmer et al. (1999) conducted a study to identify barriers to technology use that impact teachers' perceptions, values, and beliefs and how technology is used in the classroom. Some of the barriers identified include limited equipment, training, and time. Seven elementary teachers at Midland Elementary School were surveyed, observed, and interviewed to collect data on their beliefs and views of technology roles in the elementary classroom. Three of the seven teachers shared that technology incentivized or rewarded students for completing their work. However, Ertmer et al. (1999) observed that the students would not put their full focus into their work, rushing so that they could use the classroom computers. The fourth teacher shared that the technology would not be used for gaming. They also noted that students would not focus on their work as they wanted to use the classroom computer. Several teachers included that they felt that the technology was more supplemental than and kept the students busy. The educators did observe that technology can be important for students to learn how to use, but they needed to see how it was relevant to the required curriculum. Three of the seven teachers teach lower-level multi-age (MAL). It was observed that technology enriched the current curriculum the educators taught. Due to the enrichment benefits, the MAL teachers intentionally tried integrating technology into specific lessons. Of the seven teachers, only one did not think that technology should change their curriculum. It was noted that identifying where teachers are struggling with technology and learning what educators' beliefs and values are is essential for supporting teachers and their efforts for integration. Throughout this study, one teacher had great success integrating technology, and their belief in the role of technology in the classroom changed. All the teachers noted that they

experienced first-order barriers. Some of the teachers experienced second-order barriers. The results of this study suggest that the first and second-order barriers can be fixed if teachers see technology as a tool, believe that technology is a tool, and have the confidence to use and implement technology.

Miranda and Russell (2012) researched whether engagement if teacher inquiry can change educators' thoughts on technology. Thirteen teacher inquiries were studied throughout six elementary schools. The researchers used a teacher-directed student use of technology (TDS) model for gathering data on TDS factors and relationships. This model specifically focused on the experience of teachers' technology use, the benefits of technology in instructional goals, the importance of technology within teaching, and the obstacles to technology integration in the classroom. According to the research Miranda and Russell (2012) conducted, they discovered that the more often educators use technology, the more they begin to value and feel more comfortable with it being used as an instructional tool. Additionally, technology is used more within instruction and more in use with students. Based on the evidence of the study, using technology in the classroom is less substantial than the expanding increase has implied. It was identified that teachers who believe there are benefits to technology use in the classroom have students using technology more than teachers who believe that technology does not have numerous benefits. Miranda and Russell (2012) found a large impact between teachers' experiences and views, resulting in increased technology use in the classroom. Teachers' experience and confidence also have an important impact. Teachers with more experience, skill, and knowledge incorporate technology in their classrooms more than

educators with minimal skill, knowledge, and experience. This study found that confidence is a stabilizer between experience and the views of technology's importance. Miranda and Russell (2012) also shared that educators' views diminish when they face technology challenges.

Dawson and Dana (2006) researched educators systematically and intentionally studying their own practice, providing important benefits for prospective teachers participating in curriculum-based, technology-enhanced field experiences. Additionally, the focus of this study was to explore whether engagement in teacher inquiry can promote conceptual change related to teaching with technology. Dawson and Dana (2006) worked with thirteen prospective elementary teachers to gain first-hand experience with technology integration in elementary classrooms. To obtain their data, Dawson and Dana (2006) first established a familiarity with the inquiry data by fully and independently reading each inquiry. The inquiry contained information on background and context and the personal experiences of the prospective teachers that led to wondering and asking questions. Laura's inquiry aligned the closest to the research question. When Laura completed her inquiry, she focused on what best strategies supported internet-based research for fourth graders. She explored similarities and differences between the three strategies that supported her inquiry, allowing her to implement the strategies during her student teaching. The three strategies she implemented were noted to be hotlists, scavenger hunts, and student-directed searches. Although this was her focus, it was noted that she struggled with some convictions about teaching, the integration of technology, and teacher-student relationships. These events contributed to a conceptual shift

regarding her beliefs about teaching. Originally, she thought teaching was black and white, to realize there was so much more to it. It was much more difficult than she expected. Through her inquiry, Laura's thinking and beliefs shifted, resulting in her willingness to make the necessary adjustments to support technology integration. Observation led Dawson and Dana (2006) to note that technology was put before curriculum goals when technology should have been seen as a tool for support. As the question to be answered related to how curriculum-based, technology-enhanced teaching combined with teacher inquiry promotes conceptual change, Dawson and Dana (2006) shared that Laura's experience was a great example to use. Teacher inquiry motivated Laura to change her beliefs about technology usage and integration. Dawson and Dana (2006) believed that inquiry is not all about conceptual change, but this study showed that conceptual change could happen.

A study completed by Wood et al. (2005) provides a picture of fifty-four teachers' perceptions of computer implementation in their classrooms by describing what computers are used for, where they are used, what integration of technology means to individual teachers at the elementary and secondary level; what supports their use of technology, and what, if anything still stands in the way of successful implementation. They surveyed educators' perceptions regarding the barriers and supports of technology use in the classroom. The barriers identified in the study include equipment, limited access, technical problems, and malfunctions. The participants attended a session where they first completed short surveys. The survey consisted of several demographic questions followed by computer usage questions. Many participants reported that they

had experienced and were familiar with technology as it was used at home and school. Using computers was assumed to result in higher computer use in the classroom. There were six themes that Wood et al. (2005) discovered through their research. The themes included issues with support, teacher level, context, access, student levels, computer hardware and software, and external or other priorities. Support (37%) and teacher-related issues (31%) were the most discussed topics. Regarding support, teachers expressed the need for more resources, training, professional development, and support from the administration, human resources, and parents. Thirty-one percent of elementary teachers shared that their issues regarded philosophical and pedagogical beliefs, skills, and characteristics of the teachers and a divide between curriculum and technology experience. Student issues were related to the student's motivation, skills, and characteristics. Many students are capable of using technology when taught correctly. There are a few students that need help handling technology use. Only 7.9% of elementary teachers shared issues with hardware and software systems. This was a relatively small percentage of issues faced throughout the study. There were several malfunctions noted. This results from computer updates, power, or outdated devices. Even though this was a small percentage of the issues, it is still an issue as students need help to complete the activities and tasks assigned through devices. Many teachers expressed their frustration when malfunctions occurred in the classroom. Support issues had the largest response for barriers. Many educators felt they needed more support from previous training to integrate technology successfully. The study did find that teachers generally saw technology as a tool. Additionally, the teachers focused on material

resources and the availability of hardware and software systems. The educators appreciated that they felt there was enough equipment for the computers and had experienced colleagues and students who were skilled and knowledgeable. In the conclusion of this study, the interactions between individual and environmental variables need to be considered.

Donald Gillies (2008) conducted a study to explore prospective teachers' views on videoconferencing as a teaching and learning tool. Throughout educational programs, prospective teachers learn to incorporate educational and technological components into future lessons and classrooms. Gillies (2008) noted that compared to other distance education methods, video conferencing has the benefits of real-life interactions, a sense of immediacy, motivation, and collaborative learning. Additionally, access, cost, and interaction are also benefits. Even though students could not attend class in person, there was still a sense of community with live video conferencing. Social needs are still being met. With the benefits there, Gillies (2008) also observed several challenges. Although flexibility was observed to be a benefit, it was also a challenge. Sometimes, the internet connection was not always reliable, disrupting student learning. Only some educators had a backup plan in case the internet connection was unreliable. Gillies (2008) surveyed prospective teachers in five areas. Gillie's (2008) findings of the distance education experience include positive thoughts toward the option to learn from home. The prospective students felt they could better manage their time and commitments. The students also mentioned that they were placed in schools close to home and in areas where they could connect with the staff and students. Students felt less strained with

travel and needing to attend night classes. The disadvantages include having fewer tutorials, access and contact with professors, tutors, materials, and resources. In the survey, some students had not complained and thoroughly enjoyed the option to video conference. In contrast, others felt they were not real students and faced many frustrations and disruptions during the experience. These were thoughts to consider for the experience of incorporating video conferencing for elementary students. The second area of focus was the format of video conferencing. There was a wide range of impressions with the video conferencing format. On one side, students mentioned that they would not have enrolled in the course if it was not an option. Others stated that video conferencing was more suited to a more traditional lecture as there were more opportunities to ask questions. Strengths included communication. The live interactions create a real learning environment. Students still felt that there was a community. The weaknesses of the video conferencing format include time delay of the videos (based on internet connection), background noises based on the students' environments, and other technical challenges that can take place during live sessions. The third focus area was pedagogy and its relation to video conferencing. The students felt there were opportunities to still interact with their peers and engage in the lessons, but there were limitations. The example given was that the students appreciated the presence of a tutor and found it to be a strength. Many students found video conferencing lectures to be beneficial. However, there were a few that felt that it was unrewarding. The fourth focus area was a social presence. Many students valued that they were still able to connect with their peers. Others felt that connecting with peers through video conferencing could have

been more genuine. Social interaction was a valued component. Students could meet in person during the first week of classes but only continued to meet online. Lastly, the fifth area of focus on the survey was student engagement through video conferencing. Overall, the students stated they could stay engaged as long as they actively participated. One component of lectures through video conferencing that students felt made it difficult to stay engaged was the monolog of the tutor reading the PowerPoints. Technology issues, tutors needing expertise in video conferencing and its components, and talking over the PowerPoints the students had access to needed improvement for student engagement.

Wijnen et al. (2021) wanted to gain insight into what factors make up the attitudes of elementary teachers regarding technology use for allowing higher-order thinking. To collect information, Wijnen et al. (2021) led literature reviews on the attitudes of teachers towards technology use and stimulating higher-order thinking in elementary students. Throughout the study, nine factors were found on teacher attitudes, and four factors were found on attitudes toward higher-order thinking. Two studies were conducted since the initial literature review topic had a limited amount of sources. The first part of this study was based on teachers' attitudes toward using technology. Four dimensions were used to categorize the factors of attitudes. These dimensions are cognitive, affective, perceived behavioral control, and social norms. Wijnen et al. (2021) collected data by collecting relevant research. They reviewed the titles and abstracts of the studies collected to make sure the focus was aligned. The texts were then analyzed, and teachers' attitudes toward technology were identified. The extent these factors impacted teachers was also analyzed. The results of the studies were that there were many ways attitude was defined. This

resulted in researchers identifying general attitudes and not specifically focusing on attitudes about technology use. Wijnen et al. (2021) shared that the influence of self-efficacy and context dependency on the intended use of technology by teachers was reported the most, as they were mentioned in several studies. Another factor that influenced teachers' intended use of technology was perceived usefulness. As for social norms, the results will vary from each teacher to the next. Since there were limited studies on the influence of student motivation, relevance, anxiety, and enjoyment, a conclusion was unable to be made. The second part of this study focused on teachers' attitudes toward stimulating higher-order thinking. Higher-order thinking involves critical thinking, solving problems, thinking creatively, reasoning, metacognition, and reflection. Since Wijnen et al. (2021) were focused on the attitudes of teachers regarding the prompting of higher-order thinking, they focused on psychology-oriented research. The way that data was collected in the first part of the study was the same approach used in this second study. It was found that there were not many studies related to the topic of teachers' attitudes toward higher-order thinking. It was not possible for the researchers to draw a conclusion based on observations about the relationship between the factors and teachers' attitudes. However, they did gather information on why or why not higher-order thinking is used in the classroom. The conclusions of this second study are that perceived relevance and perceived student ability were identified as cognitive dimensions. Self-efficacy and context dependency related to perceived behavioral control. There were no mentions of attitudinal factors fit within the dimensions of affective and social norms. There were no findings regarding the influence of the factors on the intentions of

challenging higher-order thinking in elementary students. Wijnen et al. (2021) suggested that further research into higher-order thinking is needed.

Guha (2003) carried out a study that investigated the personal experience of elementary teachers regarding computer instructions and wanted to find out what causes educators to be comfortable or uncomfortable with using technology in elementary classrooms. Ten elementary teachers in Western New York were randomly selected. The teachers answered a survey on a five-point scale that focused on the following four areas: experience and instructional computing interest, computer knowledge, training, comfort level, and using computers in classroom instruction. Question one asked teachers about their general feelings on computer usage in classroom instruction. In the high-scoring group, teachers had positive feelings toward computers. Additionally, computer usage reinforced the skills of students as a way for students to find information. As for the low-scoring group, computers were seen as important for students learning but were seen more as an extension of learning. Question two asked teachers their thoughts on major problems they observed with computer usage in the classroom. The high-scoring group shared that availability was an issue. A second comment made was that some of the teachers felt scared to use and implement technology because of their lack of knowledge and training. The low-scoring group expressed time management, not enough computers, and a lack of training as their concerns. In both groups, training was a common theme as a major problem with computers observed in the classroom. Question three asked teachers if any changes in the way they teach were observed because of technology in the classroom. The high-scoring groups shared they identified changes in their instruction.

The teachers shared that students could publish work and use multimedia to produce materials. One teacher in this group stated that their practices did not change, but the computer helped with instruction and reinforced mathematical concepts. The low-scoring group shared they had an interest in making instructional changes. Several teachers noticed changes in their lesson plans and its importance. Question four asked what instructions were needed to make teachers more comfortable with computer use in the classroom. The high-scoring group claimed they were comfortable. They expressed that they wanted to stay up to date with computer applications and, therefore, wanted more time for training. The low-scoring group had differing comfort levels. They believed that having more computer training and workshops was needed as it would also benefit the students. Several teachers felt they had not enough time to just play on the computers. As they had more time to learn, their comfort level increased. Question five asked what the future might look like regarding using computers in the classroom. The high-scoring group shared there is potential. They believe that learning will be more interactive. The low-scoring group also believed that computers would be important for student learning. Several teachers commented that the number of devices students will have access to will increase. Also, teachers would be more knowledgeable about computers. Question six asked which computer applications were used the most in the classroom and why. The high-scoring group used word-processing applications the most. The low-scoring group used Microsoft Word the most. The students preferred window-based programs. Question seven asked teachers to describe their students' abilities to use computers. The students of the teachers in the high-scoring groups could use the computers and felt confident. Most

of the students of the teachers in the low-scoring groups could use computers confidently. Question eight asked what the benefits of students having computers at home would be. The high-scoring group thought that students having computers at home was influential on their abilities. The low-scoring group believed that students having computers at home was beneficial because they had more time to become familiar with computer functions. Question nine asked the teachers what opportunities for implementing new ideas while using aided instruction were. The high-scoring group had mixed responses. Some teachers implemented their new ideas to reinforce students' skills and publish their work. Other teachers expressed a limited amount of time to implement their new ideas. Gush (2003) shared that teachers in the low-scoring group had negative responses to question nine. They did express that their new ideas could be implemented in the future. Question ten asked the teachers to describe the technical help that was available when needed. The high-scoring group shared that they were encouraged to use computers. One teacher in this group felt they knew more about technology than the technical helper. The low-scoring group shared they received technical help when needed. Some expressed that there was on-site assistance. Others expressed that technical help came later than needed. Question eleven asked what feedback the teachers received from parents on computer-aided instruction. The high-scoring group shared that parents wanted students to have more access to computers. Not too often, parents make suggestions to teachers or school administrators. The low-scoring group shared they also had very little feedback from parents. Some parents did comment that the school did not need the computers. From this survey, Guha (2003) shared that the administration should make sure to offer

teachers continuous support and encouragement regarding computer integration in classroom instruction.

Christensen (2002) wanted to research the effects of technology integration on the attitudes of teachers and students. In a suburban public elementary school in northern Texas, sixty teachers received beads-based instruction regarding integrating computers into lessons and activities throughout the school year. The educators required two days of training. They were also provided with follow-up training every six weeks. The comparison group consisted of two similar public schools within the same school district. The educators at these two schools did not receive needs-based training. Only the standard district-level training. In the school where needs-based instruction was given, there were roughly 900 students in pre-kindergarten through fifth grade. The Teachers' Attitudes Towards Computers Questionaire (TAC Ver. 2.21) was used to gather data on teacher attitudes between the three schools. The Computer Attitude Survey was also included to collect data to link findings. Christensen (2002) mentioned that the Computer Confidence construct (CASC) was included to complete the research as parts of the others were not used. Three subsets were reserved as indicators for attitude. They include CASA (Anxiety), CASC (Confidence), and CASL (Liking). Additionally, the Young Children's Computer Inventory (YCCI) was used as a measure for teachers. This inventory collected data on Computer Importance (I), Computer Enjoyment (J), and Computer Anxiety (A). Lastly, a skills checklist and stages of adoption form were also administered to the educators in this study, and experimental items were gathered to gain additional data on the attitudes of teachers regarding teaching with technology. Three

hypotheses were investigated. First, needs-based technology-integration education fosters positive attitudes toward technology among elementary school classroom teachers (7). There were three outcomes from the data collected regarding the first hypothesis. One, teachers at the treatment and comparison sites who reported having received computer integration education tended to exhibit more positive attitudes toward information technology than their non-integration counterparts. Two, teachers at the treatment site changed to a greater extent in the direction of more positive attitudes than did their comparison group peers. Three, The integration education delivered at the treatment site had a significant effect on perceived computer importance (after controlling for frequency of use), while the effects of training at the comparison site were negligible (15). Second, teacher education in needs-based technology integration, combined with significant classroom use, fosters positive student attitudes toward information technology (7). The data gathered regarding hypothesis two indicate that “t teacher instruction in needs-based technology integration, combined with significant classroom use, fosters positive student attitudes toward information technology was accepted” (17). The techniques that relapsed confirmed strong effects regarding the extent of computer use by teachers on their students' attitudes. Third, positive teacher attitudes toward information technology foster positive attitudes in their students (7). Hypothesis three had six acceptance findings. One, Positive teacher perceptions of computer importance influence student perceptions of computer importance in a positive manner. Two, positive teacher computer enjoyment influences student perceptions of computer importance in a positive manner. Three, positive teacher enthusiasm influences student perception of Computer Importance in a

positive manner. Four, a lack of teacher anxiety influences student perception of Computer Importance in a negative manner. Five, higher semantic perception of computers on the part of teachers influences the perception of Computer Enjoyment in a negative manner. Six, no strong relationships were found in the direction of student attitudes influencing those of their teacher. However, there emerged a consistent trend of student Computer Importance negatively influencing numerous teacher dispositions related to information technology (18-19). As a whole, these findings led to the understanding that when teachers have a positive attitude toward technology, it influences students to have positive attitudes. Christensen (2002) suggested that further research was still needed to determine why specific Likert scales had opposite data than what was expected.

Ertmer and Ottenbreit-Leftwich (2010) explored technology through the perspective of teachers to gain knowledge on what enables educators to use technology as a beneficial resource in their classrooms. The four variables focused on during this study include knowledge, self-efficacy, pedagogical beliefs, and subject and school culture. The Teachers Talk Tech survey went out to teachers to complete. According to the data, eighty-eight percent of teachers use their technology devices to complete tasks. Eighty-six percent of teachers use their technology for communication purposes. According to a second survey titled Speak Up 2007, ninety-three percent of teachers also stated that they use technology for communication. Fifty-one percent of teachers who completed the second survey stated that they use technology primarily for facilitating student learning. The activities facilitated include homework completion, extra practice,

written assignments, research, and checking their grades or assignments. (These activities do vary based on grade level). Knowledge is one of the most needed components to guide teachers on their beliefs and implementation of technology. Ertmer and Ottenbreit-Leftwich (2010) share several ways that teachers can achieve technology integration that is aimed at student learning. This includes identifying technologies that are needed to support curriculum goals, specifying how the tools will be used to meet the student's goals, enabling students to appropriately use technology, and selecting and using technology for professional growth and practice. Self-efficacy is the second variable. A survey was conducted on 160 teachers. Researchers found that self-efficacy may be a more important skill than knowledge based on the data collected. In a separate study, the researcher found that there were a larger number of teachers who rated themselves with high confidence in technology use over being highly skilled. Out of 764 teachers, the greatest predictor identified regarding a teacher's use of technology was confidence. To increase a teacher's confidence, the following suggestions were shared. Teachers need time to play with technology, focusing on the needs of the teacher, focusing on small successes, working with others who are knowledgeable, having access to models, participating in professional learning opportunities, and participating in professional development programs. The third variable is pedagogical beliefs. Researchers found that belief systems influence teachers' technology use in the classroom. These beliefs were found to predict future classroom action for five of the six teachers observed. Teachers who held traditional beliefs implemented technology with low-level use. Teachers who held more constructive beliefs had a high level of

technology use that was also student-centered. Ertmer and Ottenbreit-Leftwich (2010) shared that a 10-year-long study through Apple Classrooms of Tomorrow (ACOT) observed that teachers change in students and their learning allowed for teachers to reflect on their current beliefs which resulted in a change in pedagogical beliefs. Culture is the fourth variable studied. Studies suggest that teachers have felt easily overpowered by pressures to conform to technology integration. The studies also showed that conforming to technology usage and integration was less likely to be adopted if it did not closely align with an existing culture, value, or belief system. However, educators were easily persuaded to change their values and beliefs regarding technology when they were influenced by other peers to think differently about technology. Ertmer and Ottenbreit-Leftwich (2010) stated that teachers could be supported to change their beliefs of technology integration through professional learning and development, but ultimately, teachers observing how technology impacts students learning was the most influential factor.

Shifflet and Weilbacher (2015) completed a study to examine difficulties and conflicts that impact the perspectives educators have toward implementing technology. This study developed due to a conversation with differing opinions. The first researcher, Shifflet (2015), holds an optimistic view toward technology use and integration. The second researcher, Weilbacher (2015), does not show the same level of optimism and shared concerns regarding students using technology. To gather data, research was conducted in what were described to be the most racially, economically, and linguistically diverse schools in central Illinois. Small-group interviews and classroom observation

methods were used. Two educators were observed; Mike and Cheri. Mike's belief is that technology is a tool. He did mention that most of his students see technology as a common everyday device and not seen as technology. He did not feel that technology facilitated student learning. Mike also stated that educators need to make the technology fit into the classroom curriculum. He described himself as an average technology user due to his personal thoughts on finding a way to utilize the technology during his instructions. Technology is a benefit to him and his classroom. He also stated that he feels there is a disconnect between teachers using technology for their instruction and students using the technology to guide their learning. Mike was asked about the barriers he observed with technology integration. The students had varying technology skills, specifically with keyboarding. This barrier made it difficult for Mike to feel that he had a student-centered classroom. Additionally, scheduling time and access for students to use technology was difficult. Cheri used the classroom technology available. She had a broader view of technology than Mike. She considered herself to be a low-end user of technology. She believes technology should not be used for every task or assignment as students are constantly around technology in or out of the classroom. She felt she couldn't make assumptions about students' skills, abilities, or knowledge as not all of the students had the same access to technology. Her belief is also that technology can be an effective tool for students as it makes life easier and more interesting. Barriers that Cheri identified included money and colleagues with a narrow mindset. Technology can be expensive, so having technology for teachers and students in each room can add up. As for colleagues with narrow minds, she believes that educators should broaden their horizons and take

opportunities to explore technology and its components. When comparing both Mike and Cheri's beliefs, it was evident that they both saw technology as a tool. They also shared the belief that having access to technology does not ensure that students will learn, but how often the technology is used is the key factor. Shifflet and Weilbacher (2015) concluded the study with the following findings. Mike and Cheri's beliefs were not enough to motivate them to overcome barriers. The external barriers such as access, support, and ability, had more of an influence that the internal barriers; beliefs, attitudes, and knowledge.

Hsu et al. (2011) wanted to examine the perspectives of elementary teachers and their familiarity with design, engineering, and technology (DET). Data were collected from 192 elementary teachers who participated in the DET survey. The educators represent eighteen states. The average age of the teachers was 41.5, with an average of 14.12 years of teaching experience. With a small amount of knowledge about DET, four research questions were asked. First, what familiarity and perceptions of engineering elementary teachers have. Second, does the gender of elementary teachers affect their familiarity with and perceptions of DET? Third, does the ethnicity of elementary teachers affect their familiarity with and perceptions of DET? Fourth, does an elementary teacher's teaching experience affect their familiarity with and perceptions of DET? There were four factors focused on: importance, familiarity, stereotypical characteristics of engineers, and characteristics of engineers. The results by gender showed that there was no difference between male and female participants for the four factors. Importance had a mean of 3.46 for male participants and 3.44 for female participants. Familiarity had a

mean of 2.01 for male participants and 1.89 for female participants. Stereotypical characteristics of engineers had a mean of 3.03 for male participants and 2.99 for female participants. Characteristics of engineers had a mean of 3.62 for male participants and 3.63 for female participants. The results of ethnicity did show significant differences in the four factors. Importance had a mean of 3.65 for minority participants and 3.41 for majority participants. Familiarity had a mean of 1.90 for minority participants and 1.91 for majority participants. Stereotypical characteristics of engineers had a mean of 3.01 for minority participants and 2.99 for majority participants. Characteristics of engineers had a mean of 3.52 for minority participants and 3.64 for majority participants. The results of the full-time teaching experience showed no significant differences. The importance factor had a mean of 3.35 for new teachers, 3.47 for moderate teachers, and 3.48 for experienced teachers. The familiarity factor had a mean of 1.97 for new teachers, 1.93 for moderate teachers, and 1.85 for experienced teachers. The stereotypical characteristics of engineers had a mean of 3.09 for new teachers, 2.87 for moderate teachers, and 3.04 for experienced teachers. The characteristics of the engineer's factor had a mean of 3.60 for new teachers, 3.63 for moderate teachers, and 3.65 for experienced teachers. In conclusion, some teachers were unfamiliar with DET; they felt it was important to teach DET and integrate it into the school's curriculum. Additionally, when teaching science, the teachers stated that project planning and using engineering to develop new technologies were important to include. Regarding the teacher's motivation for teaching science, promoting an enjoyment for learning, developing an understanding of the natural and technical world, preparing their students for working outside the classroom, helping

students understand how DET affects society, and developing future scientists, engineers, and technicians. The teachers also wanted to teach their students about the types of problems DET is applied to, the design process, the use and impact DET has, the science that underlies DET, and how to communicate technical information. Hsu et al. (2011) did suggest that educators should participate in professional development and learning opportunities to improve their familiarity and knowledge of DET.

Carver (2016) wanted to explore what perceptions teachers have regarding the benefits and barriers of technology integration in K-12 instruction. Students enrolled in Exceptional Student Education, Reading, and Educational Leadership online graduate courses were asked to participate in this study. Out of three hundred ten students, sixty-eight students completed the survey that was emailed to them. A majority of the participants taught kindergarten through second grade. Two-thirds taught shared they taught STEM classes. The study aimed to answer three questions. First, participants were asked about which factors impact the use of technology in K-12 instruction by the teachers enrolled in the online graduate course. Second, which factors impact how teachers enrolled in the online graduate course incorporate technology into their K-12 instruction? Third, what digital instructional benefits and/or barriers were identified by K-12 teachers? The results of the survey include one hundred percent computer usage, eighty-nine percent used a projector at least weekly, which indicated ninety-three percent computer use, and eighty-five percent daily use of a digital projector. Half of the respondents used interactive whiteboards, forty-eight percent used a digital camera or forty-seven used an iPad in their classroom about once a month. Seventy-seven percent

expressed they never use text messaging in their classrooms, and fifty percent shared they never used smartphones to deliver instruction. Four open-ended questions were asked of the participants. Question one asked what barriers teachers faced when implementing technology into their daily classroom instruction. The results of the barriers teachers identified include fifty-four total. Seventy-six percent were first-order barriers. More specifically, sixty-one percent of the barriers were the amount of technology, six percent were location, six percent were the amount of instructional time, and three percent were the availability of support. Twenty-four percent identified were second-order barriers. Question two asked what some benefits the teachers experienced when implementing technology into their daily classroom instruction. When asked about the benefits of technology use, fifty-nine percent shared that technology increased student engagement, twenty-three percent increased stated an increase in student understanding, nine percent shared an increase in instructional differentiation, a five percent increase in exposure to more current content materials, and three percent shared an increase in opportunities to use research and evaluation skills. Question three asked what factors impact the frequency with which teachers use various types of educational technology. First-order concerns consisted of sixty-seven percent of school constraints. Sixty-two percent were the availability of equipment and five percent of instructional time schedules. The total district constraint, being the amount of instructional time, was two percent. Second-order concerns regarded twenty-six percent of instructional constraints. Ten percent was related to curricular content issues, twelve percent was student engagement, and three percent was differentiated instruction. Three percent of total teacher knowledge and skill

constraints are related to ease of use. Question four asked which factors impacted the frequency and purpose of students using educational technology. This included the teacher's knowledge and skills. First-order concerns consisted of school constraints (75%). Fifty-six percent was the availability of equipment, ten percent was the instructional time schedule, and eight percent was the bandwidth. Second-order barriers consisted of instructional constraints (25%). Twelve percent were curricular content issues, six percent were student content generation, and six percent were student research. The results conclude that first-order barriers are still a concern that is impacting the use and integration of technology, The availability of equipment also had a notable impact on technology integration. The teachers liked integrating technology as they noticed an increase in student engagement. Carver (2016) suggested that future research should explore opportunities for professional development that focus on technology integration into instruction, not just access to these opportunities.

In conclusion, there are still varied perspectives on technology use and integration in an elementary classroom. The goal is for teachers to feel prepared and confident in their own skills and understanding before integrating technology into the classroom. It is also important that the teacher's perspective of technology is that it is seen as a tool, not a toy. Evidently, if an educator needed more skill or confidence, technology was likely not being used or integrated into the classroom for its intended purposes. It was noted that numerous barriers hindered the confidence of educators. With constant technological change, it can be frustrating for educators to want to learn new skills so often. One solution for the more negative perspectives was incorporating professional development

and workshops for teachers to continue learning. By providing educators with opportunities to learn, there was an increase in technology integration and use. Educators felt more confident in their abilities to use and teach those skills. Ultimately, how a teacher perceives technology use affects technology integration.

Effects of technology on student engagement and motivation. Technology can be a great resource for students. As students use technology, they become more skilled and knowledgeable about its uses and functions. With the rate technology is being brought into the classroom, especially early in students' academic careers, using technology can affect students. It is clear that technology has both positive and negative impacts on student learning. Researchers wanted to study the effects of technology on motivation and engagement. By integrating technology into elementary classrooms, educators can create learner-centered classrooms. Technology integration can help increase students engagement and motivation to create a learning environment students can benefit from.

Tosco (2015) studied the effects of technology on student engagement and retention in an upper elementary Montessori classroom. Twenty-five fourth through sixth-grade students studied over six weeks. The students were divided into two groups (Group A and Group B). Group A received the traditional Montessori curriculum and materials. Group B also received the same lesson, but the technology was incorporated into the lesson. Five data sources were used to gain data on how technology is affecting students. The five data sources include a pre-lesson feedback form, teacher response form, post-lesson feedback forms, post-lesson response forms, and an observation tally

sheet. First, teachers filled out an engagement report form. Based on responses from the teacher, there were several students who showed little motivation and engagement. Second, the students were asked to fill out a pre-lesson feedback form that asked questions regarding their attitude toward small group lessons and lessons where technology was incorporated. The data from this form showed that sixty-four percent of students enjoyed lessons that included technology in comparison to the twenty-eight percent that enjoyed lessons with the Montessori materials. Additionally, twenty-four percent of students did not like lessons with the Montessori materials, and twenty percent shared that they did not like lessons with technology. Therefore, most of the students like lessons when technology is used and dislike the lessons when Montessori materials are used. The data also shows that forty-four percent selected that they would be more interested in the lesson if technology is involved, twenty-four percent if the lesson used Montessori material, sixteen percent if textbooks were used, and twelve percent if worksheets were used. Based on the data, students stated that they would be more interested if the lessons had a technology component. Third, the observation tally sheet was split into two columns - engaged and disengaged. The tallies were marked on the sheet every five minutes for twenty minutes. This data was collected over fourteen lessons (seven topics taught twice) on levers, slavery, diagramming, cubing, comma use, congruence and similarity, and paragraph writing. The results showed that four of the seven lessons had similar engagement from students, whether technology was used or not. Three of the seven lessons had an increase in engagement when technology was used. The data shows that technology did not affect student engagement but could

support it. Fourth, students were asked to complete a post-lesson feedback form. There was a favorable response toward technology, suggesting that technology was seen as a tool that students enjoyed using. The fifth and final data source was the short answer lesson response form. Students received this form and filled it out two days after the initial lesson. Seventy-two percent of students had the correct answer filled in. For the students without technology, fifty-six percent of students had the correct answer filled in. With a sixteen percent difference in technology's presence, researchers were led to believe that students who used technology remembered information better. Integrating technology into upper elementary Montessori classrooms resulted in an increase in engagement and retention.

Carstens et al. (2021) completed a study to analyze the effects technology has on student learning. They wanted to better understand how technology is helping or hurting students when used in the classroom. A survey was used to ask open-ended, multiple-choice, and Likert scale questions. The data showed that many of the participants of this study saw technology as a tool because it enhanced learning and engaged the students. When asked how teachers use technology in the classroom, the question was geared more toward the time the devices were being used. The data from the survey showed that out of twenty-nine responses, 41.38 percent spent between zero and thirty minutes; 24.14 percent spent thirty to sixty minutes; 24.14 percent spent sixty to ninety minutes; 6.90 percent spent ninety to one hundred twenty minutes; and 3.45 percent spent more than one hundred twenty minutes using devices. When surveyed about students' reliance on technology, 79.31 percent of teachers selected that students

probably or definitely rely on technology. The survey data also shows that 68.97 percent of students have some familiarity with models of research and learning (dictionaries, nonfiction texts, alternative games, and exercises). In the survey, educators expressed that, although technology has been helpful, they still believe there should be handwriting opportunities. 72.41 percent of teachers surveyed did not have a set time for students to practice their handwriting skills. When the teachers were asked about their feelings regarding positive and negative impacts, many of the participants stated that their students are more engaged and motivated to complete their work when technology is used. It was also stated that students are more comfortable when using technology to enhance their learning. When teachers were asked about barriers to technology use, it was often mentioned that additional training would help both them and the students. Several of the teachers lack confidence in their computer knowledge and skills. Carstens et al. (2021) shared that there were more positives than negatives regarding technology in the classroom. Engagement and motivation were higher when technology was incorporated, but additional training was recommended in moving forward.

Ilter (2009) conducted a study to help in guiding students who lack the motivation to benefit the teaching process for students who speak a foreign language. Three hundred fifty students answered the survey that contained questions about motivation and technology use in EFL classrooms. An average of seventy-four percent of students reported that using technology in their language classroom increased their motivation. Roughly twelve percent of students felt neutral and fourteen percent did not agree that technology increased their motivation. When asked if technology should be used every

day in the classroom, forty-four percent of students agreed, twenty-eight percent of students were neutral, and twenty-eight percent disagreed. Question three asked if authentic materials downloaded from the internet made the students active in their learning process, seventy-eight percent agreed, eleven percent felt neutral, and eleven percent disagreed. Question four asked if computer-based teaching activities made the lessons more enjoyable. Seventy-two percent agreed, fourteen percent felt neutral, and fourteen percent disagreed. Question five asked students if technology could be boring and unnecessary. Twenty-two percent agreed, twenty-two percent felt neutral, and fifty-seven percent disagreed. Question six asked the students if they could understand the language better when their teacher used technology in class. Forty percent agreed, twenty-nine percent felt neutral, and thirty-one percent disagreed. Question seven asked if students always need their technological devices in their language classroom. Thirty-eight percent of students agreed, thirty-one percent were neutral, and thirty-one percent disagreed. Question eight asked if different technological devices should be used to increase their motivation to learn English. Seventy-one percent of students agreed, eighteen percent felt neutral, and eleven percent disagreed. Question nine asked if the lessons would be more enjoyable if their teacher used PowerPoint presentations. Fifty-seven percent agreed, twenty-five percent were neutral, and eighteen percent disagreed. Question ten asked if the lessons become boring when technology is used in every class. Sixty-three percent agreed, fourteen percent were neutral, and twenty-three percent disagreed. Question eleven asked if film, videos, CDs, and e-learning were helpful in developing their language skills. Eighty percent of students agreed, fourteen

percent were neutral, and six percent disagreed. Question twelve asked if students should use their technology devices during their project work in their EFL class. Forty-four percent agreed, twenty-one percent were neutral, and thirty-five percent disagreed. Question thirteen asked if students had the chance to teleconference through distance education with another school if it would be challenging for them. Fifty-nine percent agreed, twenty-one percent felt neutral, and nineteen percent disagreed. Question fourteen asked if their teacher should use more technology in the classroom. Fifty percent agreed, twenty percent felt neutral, and thirty percent disagreed. Question fifteen asked if computer-based lessons were more enjoyable and effective than traditional lessons. Sixty-two percent agreed, twenty percent were neutral, and eighteen percent disagreed. Question sixteen asked if using technology in their language classroom increased their motivation. Seventy-four percent agreed, twelve percent were neutral, and fourteen percent disagreed. The data suggests that technology can provide students with effective EFL activities. EFL students want their teachers to use technology in the classroom. Students reported that their motivation increased when they could use technology.

Dhir et al. (2013) wanted to analyze the instructional benefits of iPad usage in educational settings. To gather data, researchers reviewed, analyzed, and summarized relevant case studies and experiments. There were numerous benefits of iPad usage discovered. This list includes easy interaction; the iPads can be used anytime and anywhere; students can showcase and demonstrate their work; iPads are suitable for small group teaching and activities; enriches students' reading experiences; interactive and collaborative learning; Localization support (settings can change to students' native

language); many educational applications; communication improvement between students; and is energy efficient. Some data collected shows that eighty-five percent of students liked reading on the iPad, and eighty-one percent of students found the iPad easy to transport. Additionally, a little over seventy-six percent of teachers and eighty percent of students favored using iPads. The study also showed that ninety percent of students used their home devices for gaming purposes, but preferred their home devices over school devices as they had more control. Some studies that Dhir et al. (2013) analyzed suggest that there are many positive outcomes of using iPads, but there are also some long-term impacts that could negatively impact student learning. Some limitations observed include that technology can be misused if the educator does not thoughtfully plan their lessons. Due to this, some students prefer to use technology at home instead of in school. The study showed that students who used iPads did have better performance academically, but not significantly more than students who did not use iPads. The results suggest that, to be effective tools, guidelines need to be created and put in place so that features and functions can be used to their full potential. Even with some limitations, students, teachers, and stakeholders enjoy the benefits of iPads integrated into education.

Page (2002) conducted a study to compare elementary students in technology-enriched classrooms to students in a traditional classroom setting. The focus was on student achievement, self-esteem, and classroom interactions. There were 211 students who were of low socioeconomic status, as well as various backgrounds, races, and levels of ability in ten different Louisiana elementary schools. The teachers in the experiment were required to be trained and aware of any innovative uses of technology.

Throughout the year, teachers in the experimental group were asked to integrate technology tools and teaching strategies into the science, math, and language arts curriculum. Four of the ten schools took the Iowa Test of Basic Skills (ITBS) to measure reading and math. The pretest was given in April, and the post-test was given the following March. One school took the California Achievement Test (CAT) to measure reading and math. The pretest was given in September, and the posttest was given in April. Each student took the Coopersmith Self-Esteem Inventories (CSEI) during each session. The first test was taken in October/November, and the second CSEI test was administered in April/May. Page (2002) scored, analyzed, and reported each test. According to the results, the students who were in the technology-enriched classrooms had significantly higher math scores than the students who were in a traditional setting. This suggests that there is evidence that students of low socioeconomic status being placed in technology-enriched classrooms assisted students in accomplishing their academic goals in math. The results also showed that students in the technology-enriched classrooms raised the self-esteem of low socioeconomic students. Page (2002) comments that "if technology-enriched classrooms help to raise the self-esteem levels of the students involved and if increased self-esteem is viewed as a precursor to a rise from poverty, then increased technology in U.S. classrooms may be seen as an important step for low socioeconomic citizens" (14). Further evidence shows that technology-enriched classrooms were more likely to consist of student-initiated environments. This kind of environment creates student-centered and individual intersections. The data showed that technology is good for high mathematical achievement, self-esteem, and student-centered

learning environments. Students in classrooms where technology is present have higher standardized test scores, take ownership of their learning, work well in groups, and put a value on being productive students and citizens.

Alwadaeen (2022) aimed to answer the research question of how to enhance self-directed learning readiness in American K-12 schools. There are three factors that enhance self-directed learning. The three factors are the physical arrangement of the classroom, the social and emotional environment, and instruction, diagnostic, and evaluation. The physical arrangement of the classroom is important for several reasons. The research suggested that classroom space and time should be flexible and arranged so that the needs of the learner can be met. The research found that students were given the opportunity to make choices independently, use the learning resources, and students could interact with the teachers and their peers. Additionally, Alwdaeen (2022) shared that the "physical arrangements of the classroom encourage students to make experiments and discoveries which reinforce the scientific and logical procedure of self-directed learning process; instruction, diagnostic and evaluation" (4). In the study, it was observed that there was an overwhelming amount of technology in the classroom. It was also noted that students were using technology seventy percent of the time. The factors of instruction, diagnostics, and evaluation allow the learner to take responsibility for their learning by setting goals, planning achievement strategies, and evaluating the process by reflecting on their success and failures. It was observed that the classroom teacher kept a to do list for students to follow at their own pace. Students could choose a learning method that worked best for them to complete the required tasks. With

twenty-four students, the teacher expressed that they couldn't always give the students individual feedback. The teacher often paired students or divided them into groups. Students could also give each other feedback. Alwdaeen (2022) shares that "self-directed learners search for alternative strategies to achieve their goals directed and evaluated by themselves which emphasize the role of social and emotional environment on self-directed learning readiness" (4). Social and emotional factors are reflected on external and internal motivation. Intrinsic motivation plays a major role in self-directed learning due to it being classified as the starting point. It leads to self-monitoring, management, and self-evaluation. In the observing classroom, the students were reinforced with token rewards. The teacher does not give out too many rewards to make sure that students don't lose their motivation. The teacher did not want students to rely on being rewarded for everything they did. The result of this approach was "students were aware that success and knowledge are not only for gifted and smart people but also for those self-directed learners who seek information and work hard to get it" (11). The results of this study suggest that technology needs to be relevant to help enhance self-directed learning, integrating a rewards system that challenges students to be more patient and training teachers to be facilitators so students can discover how they want to learn.

Couse and Chen (2010) explored whether implementing tablet computers in early education classrooms was practical. In this study, researchers investigated the topic by observing how children adapted to tablet technology and its effectiveness in engaging the students to draw. Forty-one students were observed through videotape while using the

tablets. Mixed methods were used to gather data. First, the students were analyzed and monitored on their interaction with the tablet during and after instruction. Second, a broader scope of groups within the classrooms to identify if the age difference impacted how the students worked on the tablets. Parents of the students were given a sixteen-question survey to gather demographic information to gain information on the technological devices available at home and the patterns of technology use by the students. Only 88 percent of the surveys were returned (36 of 41). Most children live in a two-parent household with an income of $50,000 or above. It was recorded that games or educational software were an average use of twenty-two points sixty-seven minutes. Every family had a computer at home. However, only thirty students (73.2%) used them at home; twelve children (29.2%) have used touchscreen and stylus technologies. Additionally, two children (5%) had access to tablet computers, but the devices were used infrequently. The procedure was set up into four phases. Phase one included introductions and warm-up sessions. Students were given directions regarding features on the tablet. The researchers encouraged the students to explore and problem-solve out loud through peer modeling and peer teaching. The order and length of the instruction and sessions varied based on the interest and attention span of the child. Phase two included the final session of the self-portrait drawings. Students were asked to draw a self-portrait. Students used a full-length mirror to examine their features. Once the students looked at themselves in the mirror, they were able to use the tablet. Students were still able to use the mirror. The third phase consisted of interviewing children to prompt their recall. Students did not have access to the tablets once they completed their self-portraits.

Students were individually asked back to the room they completed their portraits in to ask them how they used the tablets, what they liked or disliked about the tablet, and what they found difficult while drawing their portraits. This interview took place between three and four weeks after the initial session. The students were asked to decide whether they liked drawing on the tablet or using traditional coloring materials. The fourth and final phase was interviewing the teachers in the focus group. Teachers were interviewed in groups of two or three. It lasted roughly one hour. The teachers compared the free-choice drawings to the media self-portraits. The results of tablet use show that in phase one, thirty-one children (75.6%) reached the highest level; creation. Ten children (24.4%) reached the second level; investigate. By phase two, ninety-eight percent of the students reached the highest level, while one student was still at the second level. The results of the teacher's assessment of the student's drawings show that twenty-seven of forty-one (66%) of the student's drawings were described as typical. Eight of the forty-one (20%) student drawings were described as being above expectations. The results of the time spent in each session averaged 24.05 minutes while focused on drawing and 20.32 minutes averaged at the last session. For data on persistence, there were 76 sessions where technical difficulties occurred. Forty-seven sessions (57.3%) had no technical frustrations. Seventy-three (96.1%) of sessions had three or fewer frustrating occurrences. Forty of the forty-one students were interviewed. Twenty-five children (64.10%) preferred to use the tablet over traditional materials. Thirteen children (33.33%) preferred traditional materials over tablets. One student (2.56%) did not have a preference. The

tablet appeared to be a valuable resource for students. What appeared to have the largest impact on students was how teachers utilized and implemented technology.

Yu-lin (2015) conducted a study to investigate technology-integrated language learning courses that benefit elementary language learners' motivation to learn English and its relation to students' academic performance. Yu-lin (2015) aimed to focus on two questions. Question One asked how language learners' technology learning perceptions related to their desire to learn English. Question two asked if language learners previous learning experience with technology and their desire to learn English predicted their test performance. This study focused on thirty-five third-grade students who were learning English using technology. The students had their English class two times a week, where technology was used in instruction and the student's learning process. The technology used in the classroom consisted of a smart board, videos, audio recordings, the internet, computers, projectors, and a camcorder, among other technologies available. Students were given a survey to fill out to gather data on their motivation to learn English with technology. For the desire to learn English category, there were eleven items where students were asked to select their response based on a five-point scale: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, and (5) strongly agree. Examples of the statements include: I hope I could speak English fluently (ideal self); People surrounding me expect me to learn English (ought to self); I am strongly motivated to learn English (L2 learning experience); and My English can be improved by mediated instruction (Learning Experience with Technology) (4). The section regarding the language learning experience with technology consisted of seven items. This section aimed to measure the

student's level of language learning experience with computers and their current uses of technology. The categories consisted of cell phone use, writing (word processing), computer use, Internet use, general communication (e-mail, online chat), social networking (video conferencing, Facebook, discussion boards), and viewing of English television or movies, electronic learning (CD-ROM or Internet tutorials) (4). A five-point scale was used to collect the data. The third section determined the attitudes students have toward learning English with technology. A five-point scale was used to gather the data. The scale included examples of efficiency, interest, authenticity, confidence building, and motivation building. The final grade determined the language learning experience with technology and their learning motivators to identify student performance. The results indicate that there was a positive relationship between variables regarding students' wanting to learn English. Additionally, regarding student attitudes, the learner's technology experience and motivation played a vital role in their final grades. In conclusion, the results indicate that integrating technology into language learning courses is beneficial for students. To have the best impact on student learning, Yu-lin (2015) suggests that the classroom teacher takes on the role of a facilitator and creates an environment that promotes student learning. This transitions the classroom from teacher-centered to student-centered, allowing students to become active learners. Additional factors should be explored to aid in improving student learning.

In conclusion, technology can have both positive and negative impacts on students learning. As technology continues to change and be present in classrooms, both students and teachers need to be practicing and use relevant technology. The evidence

from these studies suggests that technology can have both a positive and a negative impact on the learning process. By incorporating technology into the classroom, it can help promote a student-centered learning environment where students can take learning into their own hands.

CHAPTER III: DISCUSSION AND SUMMARY

Summary of Literature

Technology has become a common theme in the world of education. How technology is used in the classroom, the perspectives teachers have toward technology integration, and the impact technology has on students were the topics explored in this paper. Technology integration has become a driving force in classrooms worldwide. Educators are enhancing the learning experiences of students as technology is used in the classroom daily and continues to develop. As educators gain knowledge and experience on devices and software, their perspectives and beliefs constantly shift. Technology has proven to be utilized for more than just delivering information but as a way to benefit student motivation and engagement. When technology is integrated into instruction, teachers can create interactive learning environments that inspire and empower students to continue learning.

Technology is used in a variety of ways in an elementary classroom. Technology has transformed the way that educators teach, and students lear since technology is used daily in elementary classrooms. There is a rise of digital devices such as tablets, laptops, interactive whiteboards, and other educational tools and software that are used for interactive and engaging experiences for students (Butzin, 2001; Cobb, 2010; Kemker et al., 2007; McDermott & Gormley 2016; Mills & Tincher 2003; Peterson-Karlan 2015; Shively 2014; Varier et al., 2017; Webb 2011; Wilson 2003). Online educational platforms and interactive learning software are used to provide personalized learning experiences tailored to students' individual needs. Technology integration in elementary

classrooms not only facilitates active learning but also equips students with essential digital literacy skills that are increasingly important in the modern world.

Teachers and educators have varied views on technology use and integration in the classroom. Some teachers view technology as a valuable tool and resource that can enhance student engagement, foster creativity, and facilitate personalized learning experiences. They see technology as a means to supplement traditional teaching methods and cater to the diverse needs of their students. These teachers believe that when used effectively, technology can be used as an educational resource. (Carver, 2016; Christensen, 2002; Dawson & Dana, 2007; Ertmer et al., 1999; Ertmern & Ottenbreit-Leftwich, 2010; Gillies, 2008; Guha, 2003; Hsu et al., 2011; Miranda & Russell, 2012; Shifflet & Weilbacher 2015; Wijnen et al., 2021; Wood et al., 2005). On the other hand, some teachers express concerns about excessive screen time and the potential for technology to hinder social interaction and physical activity. They worry that students may become overly reliant on devices which can be a distraction if the students are not continuously monitored (McDermott and Gormley 2016). Researchers suggested that additional professional development opportunities would benefit and build the knowledge and confidence of educators (Carver, 2016; Christensen 2002; Dawson & Dana, 2007; Ertmer et al., 1999; Ertmern & Ottenbreit-Leftwich 2010; Gillies 2008; Guha 2003; Hsu et al., 2011; Miranda & Russell 2012; Shifflet & Weilbacher 2015; Wijnen et al., 2021; Wood et al., 2005). How an educator views technology use in elementary classrooms is greatly influenced by the educator's own experience and knowledge.

The impact technology has on elementary students is varied. Technology can be a great resource and plays a vital role in shaping student motivation and engagement. With the continued development of digital tools and platforms, students have access to unlimited information and interactive learning experiences that can ignite their curiosity and encourage engagement and motivation. Additionally, digital resources such as e-books, educational apps, and multimedia content enhance the delivery of lessons, making them more visually appealing and interactive. Integrating technology has impacted students by increasing their motivation and engagement through lessons, small group activities, and individualized learning opportunities (Alwadaeen & Piller, 2022; Carstens et al., 2021; Couse & Chen 2010; Dhir, 2013; Itler, 2009; Page 2002; Tosco 2015; Yu-lin 2015). Technology provides personalized learning experiences specific to students' individual needs. Technology also facilitates collaboration and communication, allowing students to connect with peers. Finally, technology enhances student motivation and engagement because it provides them with tools and resources in becoming self-directed learners.

Limitations of the Research

The research on technology use and integration in elementary classrooms provides valuable data and insight, but it also faces some limitations. As I conducted my research on technology in elementary classrooms, I was quite surprised at how limited resources were available. With technology being a popular topic in education, I expected more information on the topic. When looking for peer-reviewed articles, I used specific key terms such as "technology integration," "elementary classroom," and other

technology-related terms to lead me to useful resources. I used Educational Journals, ERIC, Google Scholar, and EBSCO MegaFILE to find the articles I used during my research. I did find that there is a lack of experimental designs, making it challenging to compare and generalize findings across studies. I also found that some of the research was outdated and did not apply to current technology trends in elementary classrooms.

Additionally, I did find quite a bit of information regarding how technology is used and integrated into elementary classrooms. However, I did not find as much information regarding the perspective of teachers or how technology affects elementary students. Technology in the classroom is not a new idea, but it is growing more rapidly than it has in the past. I do believe there should be more information on how technology affects students than what I was able to find. New technologies, software, and applications are constantly changing, making it difficult to keep up with the trends and provide enough information, research, and data on the topic. Also, students have different levels of understanding, experience, and exposure to technology, affecting the validity of the research. Lastly, the long-term effects of integrating technology into elementary classrooms remain unclear. Addressing these limitations through additional research will be crucial for informing effective implementation strategies and maximizing the benefits of technology in the elementary classroom.

Implications for Future Research

The implications for future research on technology in elementary classrooms are important for enhancing learning experiences and preparing students for the digital age. As technology continues to evolve, it is crucial to investigate its impact on young

learners. With the pace that technology is evolving, research has shown how difficult it is for schools and educators to keep up with the changes and advancements. Future research should focus on identifying effective strategies for integrating technology into the curriculum, ensuring that it aligns with educational goals to promote critical thinking, creativity, and collaboration. Exploring the role of adaptive learning technologies and personalized instruction can help tailor educational experiences to individual students' needs, fostering greater engagement and academic success. One common theme identified throughout the research was how educators felt regarding technology use in their classrooms. It would be beneficial to gain more information on how educators feel and to build their confidence in technology use and integration. Further studies should also investigate the potential risks and challenges associated with technology use to develop appropriate safeguards and guidelines for responsible technology use in the classroom. Students need proper training and instruction to use technology to its advantage. By addressing these research areas, educators and policymakers can make informed decisions to maximize the benefits of technology to ultimately shape a more effective and inclusive educational environment for elementary students.

Implications for Professional Application

As an elementary school teacher, I was curious about the impact of technology in three specific areas. First, how elementary teachers integrate technology into their classrooms. Second, the perspectives elementary educators have regarding technology integration in their classrooms. Third, how technology integration impacts elementary students. In my four years, I have had my own experiences with technology integration

that sparked my interest in researching technology. From this research, there are areas that still need to be studied and areas that can impact technology integration, teachers' perspectives, and technology's impact on students.

Elementary educators should continue to research technology integration in elementary classrooms to stay current with the constant change in technology and meet the needs of their students. In today's digital age, technology plays a significant role. By continuing to research technology integration, teachers can find ways to enhance learning experiences, engage students, and further technical skills and knowledge. Researching technology integration also provides teachers with the knowledge and tools to effectively incorporate resources into their lesson plans. This not only helps to make lessons more current but can also build confidence in elementary teachers. By embracing technology, teachers provide students with opportunities to take ownership of their own learning, preparing them for success in an increasingly digital world. Students learn to think critically, collaborate with their teachers and peers, and learn valuable skills and knowledge that will allow them to succeed in a digital world. When elementary educators research how to integrate technology, they gain the knowledge and experience to evaluate what works best to make decisions about the best technologies and practices for their classrooms.

The perspectives elementary teachers have regarding technology play a role in how technology is integrated into the classroom. The attitudes and beliefs educators have about technology significantly influence its integration and effectiveness in the educational setting. If an educator has a positive attitude or belief that technology can be

beneficial, students will be more engaged and benefit from using the technology. Teachers who view technology as a beneficial resource have recognized its ability and potential to benefit student learning and meet their individual needs. Educators accept technology to enhance teaching practices and as a way to meet the learning needs of students. Should an educator hold a negative or resistant perspective, technology will not be integrated into the classroom or used to its potential. Oftentimes, a negative or hesitant perspective is a direct result of a teacher's lack of confidence and training with the technology and applications. Additionally, there are concerns about the reliability of the technology or the potential distractions of having technology in elementary classrooms. Their hesitation to integrate technology can impact students' learning opportunities and gain important technical skills and knowledge. It is important for educators to reflect on their perspectives and engage in professional development. Gaining the skills and knowledge to implement technology benefits students and their learning environment.

Integrating technology can impact student learning by enhancing engagement, promoting participation, and developing critical thinking skills. Technology also allows for personalized learning opportunities and differentiated instruction. Students develop digital literacy skills that will prepare them for success in the 21st century. Some researchers argued that technology should not be integrated into elementary classrooms as they were seen to be distracting. Ultimately, technology integration can empower students to take ownership of their learning, spark their creativity, collaborate with teachers and peers, and improve critical thinking abilities while gaining technical skills and knowledge.

Conclusion

Educators can improve their instruction by integrating technology into the classroom. There are numerous ways that educators can implement technology. This could range from the device to the applications students use to enhance their learning. One major impact that prevents educators from integrating technology is their own understanding and skills with technology use. By attending and participating in professional development opportunities, educators can gain the confidence and knowledge needed to integrate technology as it impacts student learning. Technology can be beneficial as it personalizes and differentiates various learning needs. When a teacher's perspective of technology is negative, it takes away learning opportunities for students. Integrating technology into elementary classrooms helps prepare students to succeed in the ever-growing digital world.

References

Alwadaeen, N. B., & Piller, B. (2022). Enhancing Self-Directed Learning Readiness at Elementary Level; A Study from American Schools. *Journal of Curriculum and Teaching*, *11*(4), 24–38. https://files.eric.ed.gov/fulltext/EJ1360307.pdf

Butzin, S. M. (2001). Using instructional technology in transformed learning environments: An evaluation of project CHILD. *Journal of Research on Computing in Education*, *33*(4), 367. https://doi-org.ezproxy.bethel.edu/10.1080/08886504.2001.10782321

Carstens, K. J., Mallon, J. M., Bataineh, M., & Al-Bataineh, A. (2021). Effects of Technology on student learning. *Turkish Online Journal of Educational Technology-TOJET*, *20*(1), 105-113. https://eric.ed.gov/?id=EJ1290791

Carver, L. B. (2016). Teacher perception of barriers and benefits in K-12 technology usage. *Turkish Online Journal of Educational Technology - TOJET*, 31 Dec. 2015, eric.ed.gov/?id=ej1086185.

Christensen, R. (2002). Effects of Technology Integration Education on the Attitudes of Teachers and Students. Journal of Research on Technology in Education, 34(4), 411–433. https://doi.org/10.1080/15391523.2002.10782359

Cobb, A. (2010). To differentiate or not to differentiate? Using internet-based technology in the classroom. *Quarterly Review of Distance Education*, *11*(1), 37–45.

Couse, L. J., & Chen, D. W. (2010). A Tablet Computer for Young Children? Exploring its Viability for Early Childhood Education. Journal of Research on Technology in Education, 43(1), 75–96. https://doi.org/10.1080/15391523.2010.10782562

Dawson, K., & Dana, N. F. (2007). When curriculum-based, technology-enhanced field experiences and teacher inquiry coalesce: An opportunity for conceptual change? *British Journal of Educational Technology*, *38*(4), 656–667. https://doi-org.ezproxy.bethel.edu/10.1111/j.1467-8535.2006.00648.x

Dhir, A., Gahwaji, N. M., & Nyman, G. (2013). The role of the iPad in the hands of the learner. *J. Univers. Comput. Sci., 19*(5), 706-727. https://www.researchgate.net/profile/Nahla-Gahwaji/publication/282762682_The_Role_of_the_iPad_in_the_Hands_of_the_Learner/links/5f06e00c299bf188160e693d/The-Role-of-the-iPad-in-the-Hands-of-the-Learner.pdf

Ertmer, P. A., Addison, P., Lane, M., Ross, E., & Woods, D. (1999). Examining teachers' beliefs about the role of technology in the elementary classroom. *Journal of Research on Computing in Education*, *32*(1), 54. https://doi-org.ezproxy.bethel.edu/10.1080/08886504.1999.10782269

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher Technology Change. Journal of Research on Technology in Education, 42(3), 255–284. https://doi.org/10.1080/15391523.2010.10782551

Gillies, D. (2008). Student perspectives on videoconferencing in teacher education at a distance. *Distance Education*, *29*(1), 107–118. https://doi-org.ezproxy.bethel.edu/10.1080/01587910802004878

Guha, S. (2003). Are we all technically prepared?—Teachers' perspective on the causes of comfort or discomfort in using computers at elementary grade teaching. Information Technology in Childhood Education Annual, 2003(1), 317-349.

Association for the Advancement of Computing in Education (AACE). Retrieved May 6, 2023, from https://www.learntechlib.org/primary/p/17770/.

Hsu, M., Purzer, S., & Cardella, M. E. (2011). Elementary Teachers' Views about Teaching Design, Engineering, and Technology. *Journal of Pre-College Engineering Education Research (J-PEER), 1*(2), Article 5. https://doi.org/10.5703/1288284314639

Ilter, B. G. (2009). Effect Of technology on motivation in EFL classrooms. Turkish Online Journal of Distance Education, 10 (4), 136-158. Retrieved from https://dergipark.org.tr/en/pub/tojde/issue/16914/176463

Kemker, K., Barron, A., & Harmes, J. C. (2007). Laptop computers in the elementary classroom: Authentic instruction with at-risk students. *Educational Media International*, *44*(4), 305–321. https://doi-org.ezproxy.bethel.edu/10.1080/09523980701680888

McDermott, P., & Gormley, K. A. (2016). Teachers' use of technology in elementary reading lessons. *Reading Psychology*, *37*(1), 121–146. https://doi-org.ezproxy.bethel.edu/10.1080/02702711.2015.1009592

Mills, S. C., & Tincher, R. C. (2003). Be the technology: A developmental model for evaluating technology integration. *Journal of Research on Technology in Education*, *35*(3), 382. https://doi-org.ezproxy.bethel.edu/10.1080/15391523.2003.10782392

Miranda, H. P., & Russell, M. (2012). Understanding factors associated with

teacher-directed student use of technology in elementary classrooms: A structural equation modeling approach. *British Journal of Educational Technology*, *43*(4), 652–666. https://doi-org.ezproxy.bethel.edu/10.1111/j.1467-8535.2011.01228.x

Page, M. S. (2002). Technology-enriched classrooms: Effects on students of low socioeconomic status. *Journal of Research on Technology in Education*, *34*(4), 389. https://doi-org.ezproxy.bethel.edu/10.1080/15391523.2002.10782358

Peterson-Karlan, G. R. (2015). Assistive technology instruction within a continuously evolving technology environment. *Quarterly Review of Distance Education*, *16*(2), 61–76.

Shively, K. (2014). Digital progressive learning environments for elementary children. *Curriculum & Teaching Dialogue*, *16*(1/2), 141–156.

Shifflet, R. & Weilbacher, G. (2015). Teacher Beliefs and Their Influence on Technology Use: A Case Study. Contemporary Issues in Technology and Teacher Education, 15(3), 368-394. Waynesville, NC USA: Society for Information Technology & Teacher Education. Retrieved June 22, 2023 from https://www.learntechlib.org/primary/p/147400/.

Tosco, J. E. (2015). The effects of technology on engagement and retention among upper elementary montessori students. https://sophia.stkate.edu/cgi/viewcontent.cgi?article=1120&context=maed

Varier, D., Dumke, E., Abrams, L., Conklin, S., Barnes, J., & Hoover, N. (2017).

Potential of one-to-one technologies in the classroom: teachers and students weigh in. *Educational Technology Research & Development*, *65*(4), 967–992. https://doi-org.ezproxy.bethel.edu/10.1007/s11423-017-9509-2

Webb, L. (2011). Supporting technology integration: The school administrators' role. In *National Forum of Educational Administration & Supervision Journal* (Vol. 28, No. 4, pp. 1-7).

What is a student-centered learning approach?: Renton Prep. Renton Prep Christian School. (2022, September 7). https://rentonprep.org/what-is-a-student-centered-learning-approach/#:~:text=A%20Student%2DCentered%20Approach%20in,process%20more%20meaningful%20to%20students.

Wijnen, F., van der Molen, J.W., & Voogt, J. (2021) Primary school teachers' attitudes toward technology use and stimulating higher-order thinking in students: a review of the literature, Journal of Research on Technology in Education, DOI: 10.1080/15391523.2021.1991864

Wikimedia Foundation. (2023, July 3). *Student-centered learning*. Wikipedia. https://en.wikipedia.org/wiki/Student-centered_learning

Wilson, J. D., Notar, C. C., & Yunker, B. (2003). Elementary in-service teacher's use of computers in the elementary classroom. *Journal of Instructional Psychology*, *30*(4), 256–264.

Wood, E., Mueller, J., Willoughby, T., Specht, J., & Deyoung, T. (2005). Teachers'

perceptions: Barriers and supports to using technology in the classroom. *Education, Communication & Information*, *5*(2), 183–206. https://doi-org.ezproxy.bethel.edu/10.1080/14636310500186214

Yu-lin, C. (2015). The impact of technology-integrated instruction to elementary students' language learning motivation and performance. *Journal of Literature and Art Studies*, *5*(8), 679-685. http://www.davidpublisher.com/Public/uploads/Contribute/55d1a1609b552.pdf