THE IMPACT OF TECHNOLOGY ON LITERACY IN ELEMENTARY SCHOOLS WITHIN THE UNITED STATES

Amanda Kozlek

Submission to the School of Liberal Studies and Continuing Education

In partial fulfillment of the requirements

For the degree of Bachelor of Arts in Liberal Studies

Purchase College

State University of New York

Spring, 2023

Instructor: Ursula Heinrich

TABLE OF CONTENTS

ABSTRACT

Background: Teaching at the elementary level has changed drastically within the past 20 years. Our modern society illuminates the importance of having accessible technology in elementary classrooms, and the effect it has on literacy.

Objective: This study aims to research the pros and cons of having accessible technology in classrooms at the elementary level when considering literacy. It also goes into depth about how teachers can utilize technology within their lesson plans effectively.

Design and Method: The research method is based on peer-reviewed literature consisting of case studies, scholarly articles, online publications, and journals. The research performed is qualitative and the case studies that I reference range from 2007-2021. These studies delve deeply into the pros and cons technology has on literacy. My main research question is; *In what ways does technology impact literacy in elementary aged children?*

Results: The significance of this study is to show that technology can be a tool that the students and teachers can utilize within the classroom without it being a distraction.

Conclusions: The government funding for technology in the school system has skyrocketed, especially in the post pandemic world we live in. Technology within the classroom shows positive associations with regards to literacy. It was also shown that technology is only effective when the educators had the proper training to effectively incorporate it into their everyday lesson plans.

Keywords: *Literacy, Elementary, Technology, Education, Effects*

CHAPTER 1

INTRODUCTION

In the United States, literacy scores at the elementary level have decreased over the years (Barshay, Flynn, Sheasley, Richman, Bazaar, & Griesbach, 2021). This Senior Capstone will be an in-depth study of how technology has impacted students' literacy at the elementary level in a classroom setting in the 21st Century. This topic is important because children are the future of our country. In addition, literacy helps individuals to access and exercise various rights and entitlements provided to them under the Constitution. Therefore, How can students see themselves as future leaders if they have no passion or interest in the foundations of a literate society?

There has been a decline in student engagement and their passion for learning and continuing reading outside of school walls when looking at PreK-5 students (Barshay, Flynn, Sheasley, Richman, Bazaar, & Griesbach, 2021). Technology may be incorporated into the home environment as a leisure activity and less as a tool used for literacy education.

During the past two years, COVID-19 increased the need for mobile technology due to the lockdown of schools and education moving to remote learning. As a result of this dynamic shift, the need for professional development for teachers and staff in technology was paramount. The aim of this study is to focus on how mobile technologies are being integrated into a classroom setting and how these tools are beneficial or have an adverse impact on elementary students' educational outcomes. In addition, the study will attempt to answer the following research questions:

RQ: *In what ways does technology impact literacy in elementary-aged children?*

High standards are important as we impart knowledge and skills to our students. “To make this happen, teachers can incorporate technology in the classrooms to maintain continuity with the outside world (Lopez-Lopez, Hussein, & Ali, 2012, p. 186). An important aspect to consider is the technology skills of educators. Professional development is a vital factor for successful integration so that literacy skills are impacted positively.

CHAPTER 2

LITERATURE REVIEW

Introduction

In the United States, technology has been making itself at home in the elementary school system. This literature review will be an in-depth discussion of the ways technology has impacted students' literacy at the elementary level in the 21st century. This topic is important because children are the future of our country. How can they see themselves as future leaders if they have no passion or interest in the foundations of a functional society? There has been a decline in student engagement and their passion for learning, along with their reading outside of the school walls when looking at Pre-K-5 students. After the pandemic, technology became a tool used at home. This study will illustrate how mobile technologies are integrated into a classroom setting and how these tools benefit or negatively impact the student's educational goals.

Teacher Accessibility

Technology is being implemented in classrooms at a national level, but the same can't be said for teacher training. Teachers are the bread and butter of the education system. What this means is that, without the teacher's expertise on the material (in this case, technology), it will be difficult for them to apply it on an everyday basis in their lesson plans. According to Team (2020), over 2.3 million teachers in the U.S. are tenured. Meaning over 2.3 million teachers cannot be fired without proof of malpractice or inability to perform their job. Unfortunately, being technology illiterate does not fall into the category of inability. On the other side, teachers

who know how to use and implement technology were then inspired and encouraged to take risks and explore new approaches to teaching.

The literature review by Eutsler (2021) goes into detail about visual literacy in the education system, how teachers use technology to prepare literacy lessons, especially when reading electronically, and the progression of digital books. “This study includes preservice teachers (PSTs) from one context, one classroom, and one technology application, to design one digital book” (p.842). Visual literacy includes not only art & design, but also communication, language, and interaction. Eutsler showed evidence supporting the stance that teachers do not incorporate technology as much as they should, considering the influx of students using technology so often outside the classroom. She discussed the difference between learning about technology and engaging with technology to use it. When teachers started creating their digital books, it included multiple modes of communication. The digital books can be exported into any site and are easily shareable. This sharing is helpful when teachers who are less technology-driven can reap the benefits of teachers who are and implement those stories in their classrooms. Eutsler stated they “found that while 55 PSTs were labeled as technologically literate, only about 10% used technology for educational purposes” (p.835).

Smith (2021) discusses how the Indiana school system is one of 8 states that allow elementary school families to pay for books and other technologies related to ~~an~~ education and how the pandemic affected this hardship. According to Smith, in the 2019 school year, fees for elementary students ranged from $50 to $247. In the pandemic in 2020, those numbers changed to $100-$248. Once the pandemic hit, the state of Indiana encouraged districts not to charge fees for technological devices, but it was ultimately up to each district. With this divide of funds (despite donations from private sectors or use of the CARES Act), some districts still charged

fees for textbooks, technology, and other materials. The CARES Act, 'Coronavirus Aid Relief Economic Security,' is meant to provide economic assistance quickly and straight into the homes of Americans in need. The state claims that if they covered these expenses, each district would face constant budget cuts, and their extracurricular activities would not be as prominent as they are. With the extra fees involved with materials at the elementary level, teachers find it hard to teach certain lessons because not all students are on an equal playing field. It is hard to consider equity when each district in a single state is at different levels financially. Smith (2021) states,

> As technology use in the classroom, or, more accurately, technology put to use as a substitute for the classroom, continues to permeate education, it will only continue to exacerbate the disparate impact the lack of access to these resources has on certain students. (p.92-93)

During the hardship of the pandemic, the lower-income communities were left to pay the fees, which left some students without the ability to attend school.

Taylor (2020) goes into depth about third-grade literacy in the United States. It states that about two-thirds of all fourth graders nationwide fail to comply with the literacy standards and that educators are having difficulty keeping up with the technological advancements within a classroom setting. This data stemmed from 34 classroom observations from 16 classrooms, with interviews from each teacher pre- and post-observation. With these observations, they created codes. One code was, so they could figure out how technology functioned in an instructional environment (SAMR Codes; Substitution Augmentation Modification Redefinition model), and broke it down into four categories; substitution, augmentation, modification, and redefinition. The next code (Bloom's Taxonomy) dealt with the comprehensible complexity of technology-orientated tasks and broke it down into six categories; remember, understand, apply, analyze, evaluate, and create. The last set of codes that is mentioned is the Engagement codes. This code

is where the researchers take their observations from watching students in the classroom setting and determine if they were engaged. Out of the 34 observations, 30 regularly used technology in the classroom. For example, one teacher stated, "…we don't do guided reading…we had a diagnostic in the beginning, and the program gives them lessons based on how they scored on that diagnostic" (Taylor, 2020, p. 12-13). This example would be categorized under substitution in the SAMR model. It is a substitution because technology replaces the teacher's group instruction with a more personalized lesson for the student's individualized needs.

Technology can help students learn and understand new materials when it comes to literacy and comprehension. Although, there needs to be a shift in the mindset of teachers, and it needs to be accessible to all students despite personal financial burdens. Teachers and staff must be willing to learn and adapt to a new technological world.

Engagement and Comprehension

Jones (2017), sheds light on the STEM (science, technology, engineering, and mathematics) curriculum that is now integrated into the Pre-K-5 system. The article explains, "The school environment provides an excellent format for integrative literacy activities focused on STEM" (p.25). For example, in upper elementary, teachers asked the students to create a walking path around the school grounds. The technology being used here may be a 3D model of the school that they use to engineer a path for all students (physically able and disabled) and problem-solving (what if they're on a hill). In the early elementary grades, they may be asked to make a new playground for the school that all students can access. The students would be sharing ideas, building with blocks connected to an electronic device, and they are able to share with other students in the class to see if they can help solve something with their or their peers'

work. Another proposed problem is creating a new food station or menu at school. They use technology to develop a model of what the new station may look like and use the internet for previous lunch items and how they can improve on them. STEM programs, and the technology they use, help students achieve academic excellence.

Paek (2021) goes into depth about using tablets (mobile technologies) in science classes as notebooks instead of the traditional pen and paper at the elementary level. This article focuses on using tablets as a tool instead of what children recognize them as (an outlet for leisure). It explains that scientific literacy is multiple practices that one must continuously exercise instead of just memorizing facts. Scientific literacy is "to ask questions, develop models, plan, and conduct investigations, analyze data, use mathematics, construct explanations, engage in argument, and communicate information" (Paek, 2021, p. 360). Some researchers advocate for physical notebooks because they can "construct understandings through drawings and writing, and engage in metacognitive awareness" (Paek, 2021, p. 360). Children with physical disabilities also need to be considered when deciding to use technology or traditional methods—taking into account the challenges they face writing or processing their thoughts into a written text. The tablet devices discussed allow them to use the clipboard (copy, paste, cut), camera, and audio. All these factors have shown improvement in students' understanding of the material. Using the camera feature allows students to take pictures of models instead of hand drawing them, which can be taken at different angles to help them engineer a solution to the model at hand.

Children use the audio feature to get their ideas out before articulating them in written words, and by hearing themselves explain the point they are trying to make, they could figure out if they left anything out. They also noticed children taking photos of other groups' work and building on their findings, which would be difficult if it was all handwritten and drawn out. One

problem children found an issue with was writing on the tablet for notes. Their main concern was having it 'neat.' Unfortunately, the tablet does not account for neatness. When the staff brought up the touchscreen keyboards, it became more of a distraction than a help. So, moving forward, the teachers would have trained the kids on proper handling materials and apps so that it can be a beneficial learning experience rather than a hindrance on their scientific journey.

Spooner (2015) discusses the effects of technology on literacy with five students with severe disabilities. There were two dependent variables on how they started to collect their data. The first dependent variable was "…defined as each student's independent correct responses for items on the task analysis of the shared story for each adapted chapter of Charlotte's Web" (Spooner, 2015, p.56). This dependent variable allowed the student to have nine chances to; identify the book title, identify the author's name, select the correct vocabulary/definition, turn pages, point left to right as if they were reading and following along, identify the repeating storyline, and answer two different comprehension questions. These questions were provided on a mobile touchscreen device, and the app gave them different clues (pictures, text, and audio). Using these variables, students scored an 8 out of 9 when the stories were shared and for three consecutive sessions. The second dependent variable was the number of listening comprehension questions they could get independently correct. Technology in this small sample gauges their comprehension and ability to listen to directions or read. The article shows a chart that shows different categories and how many seconds it took for the students to respond. Technology, in this case, is a great way to gauge students with disabilities who can't communicate as well (if at all) with their educators. Using these programs tracks and saves all their responses and response time, which helps the educator pinpoint in what areas they should focus. Next, the article breaks down the listening comprehension of students. Technology, paired with explicit instruction,

appears to have a positive outcome for comprehension with students with severe disabilities. This method ensures success because the device does not substitute the teacher but adds to their effectiveness.

Tracey (2007) is a case study that was done on 265 kindergarten students over ten months in an attempt to figure out the validity of the Waterford Early Reading Program (WERP), a software similar to ILS (Integrated Learning Systems, which is also referred to in Putnam, 2016). These 265 kindergarteners come from low-income communities and are considered at higher risk for acquiring an adequate education. The study was divided by the number of access students had to the program. One hundred fifty-one students used WERP for at least 15 minutes daily. In comparison, 114 students had access to older hardware/software that their teachers did not necessarily use. All the students were pre- and post-tested using the TERA-2 assessment, Lindamood test, and the Waterford Reading Inventory. TERA-2 testing focused on "alphabet recitation, letter recognition (untimed), book handling skills, print convention development, comprehension, word recognition, and reading comprehension" (Tracey, 2007, p. 453). The Lindamood Auditory Conceptualization test is used to measure students' auditory processing, while the Waterford Reading Inventory measures early literacy skills taught in Level 1 of WERP. This study showed that students who were at high risk of reading failure did exceptionally well in their early literacy skills when they participated in WERP.

Putnam (2016) discusses the effects of regular use of Istation in 12 kindergarten classrooms during 24 weeks using Vygotsky's social learning theory. Vygotsky (1978) believed "children develop understandings about language, reading, and writing through social interactions that occur with more knowledgeable others 'MKO'" (p. 1156). Integrated learning systems, 'ILS' in general, focus on mastering skills. It is a technological program that assesses students' needs

based on how they answer questions and move on to the next topic once they master the initial skill. Istation is a privatized integrated learning system that originated in Texas but has an estimated user ship of 4 million students. Istation Early Reading focuses on the five factors of reading: phonemic awareness, alphabetic knowledge, vocabulary, comprehension, & fluency. On the faculty side of it, the "Istation program was developed around four main components: assessment, instruction, reporting, and teacher tools" (p. 1160). This study took 72 students from two districts in the suburban south. Six classes, in three schools, in district A required all faculty to use this program frequently. While district B also uses technology, this program wasn't a requirement. District B's goal was to stick with a more traditional curriculum when teaching the children literacy. District B was also dispersed into three schools, these six classrooms were considered the control group. ILS's effect on early literacy skills has proved to be indefinite as the results are mixed. However, it is seen to have a positive impact on early literacy skills.

There is substantial evidence that technology, in conjunction with teachers, helps students achieve their academic goals in general and special education at the elementary level. The only issue is the lack of studies conducted about students at this level with technology.

Clarke (2020) aims to get children (in this case, 4th graders from Maine) to become global citizens through digital literacy. Children are now exposed to the world through technology devices (television, smartphones, computers, and Alexa), and even though that may make them aware of cultural situations, it does not automatically mean they understand what they see and hear. "… I created the Walk a Day in My Shoes project to provide a starting point for teachers to cultivate cross-cultural understanding…" (Clarke, 2020, p.663). Technology was used in this project by allowing students to learn and experience other cultures and learn more about themselves without ever having to leave their classroom. Clarke started the project by

having the 4th graders walk around their class with markers. Next, there were hung pieces of paper with certain countries (France, Morocco, Ireland, Romania, and Malaysia; all countries included in the project). The students had to list all they knew about that specific country, granted it wasn't much. Clarke (2020) made the students participate in two categories: producers and consumers. First, producers created a digital story about an average day in their lives, detailing the smallest things and what they felt were special or important (hobbies, traditions, food, pets, etc.). Then, the students uploaded their narrative videos on the project's YouTube channel. Consumers engaged with students around the world who were also participating in this project through those students' YouTube videos. When the consumers finished analyzing and learning about these different cultures, they were given a worksheet to answer reflective questions. This project helped students think broader, work on their reflection and comprehension, and start the foundation of building stronger connections with one another.

Another article by Eutsler, The Influence of Mobile Technologies on Preschool and elementary children's literacy achievement (2020), goes into depth about mobile technologies (iPads, iPods, tablets) and their effects on literacy, especially comprehension in Pre-K—5th-grade students. It discusses 61 studies from a 12-year period, 2007-2019. According to this article, at least one in every five students across the U.S. has a mobile device in school which is supplied by the 3-billion-dollar budget (2016) that is used to supply the technology and all the applications that come with it. The article discusses the effects it has on children's literacy (phonics, phonemic awareness, fluency, vocabulary, and comprehension). It was found that "…students who used eReaders showed a significantly higher outcome on comprehension scores than students who read printed books, noting a positive association among bilingual students…" (Eutsler, 2020, p. 1752). There was also positive feedback when considering students reading

comprehension by asking questions when reading digital interactive books versus having a physical hard copy in front of them. Children in the early elementary levels using mobile technologies to improve their knowledge of expressive vocabulary helped “an average of one known word at pretest to an average of 21 words at posttest” (Eutsler, 2020, p. 1753). English learners showed the most positive feedback for electronic devices. They are able to use the playback function, which allows them to hear certain readings again and again, which helps their listening and fluency comprehension. Although, “participant groups, using digital and traditional flash cards for letter and sound acquisition, found no differences” (Eutsler, 2020, p. 1755). App designs are also a significant factor in literacy at this age level (Pre-K—5th). The app designs that were more like a game were linked to a higher number of students' engagement and attention.

Positive Impact of Technology

It is not hard to find articles boasting about how great technology is because there are many upsides. Charles Nechtem Associates (2021) states; organization, research/critical thinking, self-expression, creativity/exploring interests, and bonding with different communities are all positive aspects that are possible with the use of technology. Technology can connect people from all over the world. If a child doesn’t feel at home in their environment, they can connect with someone across the country with similar interests and find solace. The article also explains that with the countless apps available, kids can stay connected and organized with shared calendars and group messaging to stay in the know with their friends and family. With so much information readily at their disposal, it also helps kids learn critical thinking skills when trying to decipher if a source is credible. Saro (2019) explains one is able to incorporate (with the help of technology) not only the students physically in that classroom but from the whole school,

even the district, to participate in lessons and to exchange different ideas. You can create a forum for students to voice their opinions and experiences, which can help shape the way educators approach certain topics. (Western Governors University (2019) states that some pros listed are improving students' multitasking skills, helping them understand certain materials better, especially in a classroom setting, and improving visual-spatial development. When using technology, children can listen and take notes. When using certain apps or educational games, they can gain skills that help them read maps and puzzles or communicate a game plan they want to execute if playing with multiple players. Overall, technology can be a great tool if monitored and used sporadically.

Negative Impact of Technology

According to the article from (Western Governors University, 2019), some negative aspects of early technology use are mentioned; lower attention span, increased risk of privacy breaches, more at odds for developing depression, obesity, issues socializing, and poor grades. Technology has all the answers at your fingertips, so when wanting to solve a problem when using a phone or tablet, it can be pretty quick to get a solution. The downside of the speed technology brings is that students expect everything else to be as immediate. With the growing use of technology, children have become accustomed to the 'NOW' instead of waiting or trying a different route to find the answer (talking to people, going to a library), which in turn affects their attention span. Children nowadays have all the apps, and with the constant downloading and sharing, privacy has become an afterthought. It is easy now for hackers to get what kids may think is private information, and this can put not only their accounts at risk but their identity as well. These apps, such as Instagram and TikTok, provide constant gratification to users. If you post something and someone clicks it or 'hearts it,' your mind gets an immediate rush of

dopamine which can be hard to keep up with in the real world. If one gets so consumed with the technology, they spend less time outside and exercising, which can cause adverse effects on their overall health. (Saro (2019), explains how technology can be detrimental to physical, social, and emotional development. This situation can happen when children spend more time on their devices rather than interacting with the real world. Babies, for example, are more likely to be stuck in a bouncing chair with a tablet, although that isn't how babies develop their neural development.

Additionally,-Strom (2021) mentions that there need to be policies in place that help ensure success for our students when using these technologies. Advertisements should be monitored to keep exposure to certain things at a minimum; there should be a time frame, so children do not disassociate or become unhealthy physically and mentally. She mentions that children should not use devices before bed, especially on school nights, so they do not develop poor sleeping cycles. Overall, when in the classroom or at home, students and parents should set boundaries around technology devices. It is easy for these devices to take over their mental health and get confused with what is real and what is not. It was shown in this thesis that students could not tell an actual photo from what was photoshopped. There has become a thin line of reality with constant exposure, which leads students to create false expectations for themselves. Which then decimates their self-esteem, which leads to poor mental health. The negative aspects for educators are mentioned when keeping kids on task is considered. Children learn at different paces, so it is hard to continue lessons when half the class is not there yet. With the more traditional model, the students could read ahead or do another activity; when technology is involved, they can roam and browse. This freedom can be dangerous when considering what content is out there for their consumption.

Conclusion

Although compelling studies have shown positive associations between literacy at the elementary level with technology, there is not enough concrete evidence to say this is the best way to educate young minds. Technology can be a real asset in the classroom when utilized correctly by teachers. However, in most cases, teachers are taught how the programs operate but do not focus as much on how to use them in lessons. As much as educators teach students how to use technology as a tool, the education system should also have in-depth training with all faculty on how to incorporate it into everyday lesson plans.

CHAPTER 3

METHODOLOGY

My research for this literature proposal is qualitative. The method I used is a systematic and thematic literature review. I am using case studies from researchers across the United States and analyzing their data to help me answer my research question. This review focuses on children at the elementary level who frequently use technology in the classroom. Then analyze that data to see if it enhances or hinders students' literacy development. Technology is becoming more prevalent when looking at educational tools across the United States, but not so much the effects it has. All of my research comes from scholarly articles from 2000 up until the present day, 2022, found in the Purchase College Library online database, Academic Search Complete. The one question that has guided my research thus far is:

RQ#1: *In what ways does technology impact literacy in elementary-aged children?*

The keywords used to help my research on the Purchase College Library database are *elementary, literacy, technology, teachers, United States, and Covid-19.* With over 1,500 results, I narrowed it down to 10 scholarly, peer-reviewed articles. Although my data was initially set for 2018-2022, unfortunately, there was not much data on the subject, so I decided to broaden the research. With the case studies I found, I am now able to compare them not only numerically according to how many children passed their quotas for the time they were being studied but also how technology has impacted the students, whether they are English learners or get distracted using technology instead of a physical teacher doing everything. A possible limitation when conducting this research topic is time. These case studies are for short periods of time, but it

would be ideal to follow a specific group of children over a few years to see if there is an effect of technology. Therefore, a longitudinal study would be beneficial in the future. What helped my research was having all the case studies printed and physically in front of me.

When I began researching this topic, I already had a bias. I was biased because I worked in an elementary school. I saw how certain programs on the Chromebook excited the elementary students to learn, but I also saw the lack of attention and focus when the Chromebook was no longer in use. I saw the fifth graders rushing their work to sneak YouTube time or another website that was not quite school appropriate. They were able to rush through it because the lesson plans were going at their pace, and yes, this could be productive for students who have a more challenging time grasping the material, but it is not a one size fits all solution. Technology in classrooms, in my opinion, can be a great tool, but they have to be used properly, which I don't think they are. From what I saw in my line of work, it seems to be replacing the teacher rather than a tool to assist.

There were three significant limitations when writing this study. The first limitation I encountered was the lack of research on this subject area. There have been a lot of resources geared to help schools across the country stay technology literate, but not enough resources or studies are being done to see if they help students. The second limitation is my lack of time and resources. For my research, I am solely relying on several researchers' work. If I had the time and resources, I would conduct my study by investigating several grades at the elementary level in different districts with varying levels of active technology use in the classroom. The last limitation I encountered was finding studies that answered my research questions.

CHAPTER 4

RESULTS

Findings

Technology has impacted elementary-aged children in the United States in more ways than one. Technology is a significant factor when considering social skills, literacy, and overall mental and physical health. Technology has also impacted teachers' ability to conduct engaging lesson plans when considering the traditional approach versus the new teaching model the 21st century has brought forth. Therefore, the one question that takes precedence in this research paper is (1) How does technology impact literacy in elementary-aged children? In order to prove my research question, I had to utilize ten scholarly, peer-reviewed case studies from researchers from across the United States and four popular articles that helped back my claim. Filtering through the many case studies that arose when researching this topic came down to students' test scores and performance evaluations. These case studies went in-depth on how technology impacted not only their literacy but attention span and engagement.

In What Ways Does Technology Impact Literacy In Elementary-Aged Children?

When discussing literacy at this age group, one must also take into account engagement and comprehension levels. For example, the case study by Jones (2017) explains the usefulness of technology when integrated with the STEM (Science, Technology, Engineering, Math) Program. They saw an increase in student engagement and comprehension. When given a task, for example, the students had to create a path around the school grounds using a 3D model. Instead of going the easy route and creating a border around the property, the children began

asking inquisitive questions. They wanted to know if there was a hill and, if so, could every student go up and down freely (handicap included), and they made accommodations for that in their sketches. Another study from Paek (2021) explained the challenges of using a tablet as a scientific notebook. Yes, it was helpful when students had to reflect on their work and could use pictures and other students' ideas to draw from. However, it became more of a challenge when students focused more on the neatness of their work rather than the quality that followed. In a way, it became an equal distraction as it was a tool. Spooner (2015) goes in-depth on how technology assisted students with learning disabilities and who was non-verbal. In this circumstance, technology improved the students' testing scores by allowing the staff to see their continuous progress daily so they knew what areas to focus on more. Some students had trouble writing and holding a pen or pencil, so tapping on the tablet was easier for communication. The program used "…defined as each student's independent correct responses for items on the task analysis of the shared story for each adapted chapter of Charlotte's Web" (p.56).

Even in the youngest grades of Pre-K and Kindergarten, Tracey (2007) discusses how those students were excited to read from their technology-accessible classrooms. The apps appealed to them like a game and gave them instant gratification if they got the correct answer and let them move forward. This study discussed the testing used technology that benefited the children's "alphabet recitation, letter recognition (untimed), book handling skills, print convention development, comprehension, word recognition, and reading comprehension" (p. 453). Technology also helps the teachers gauge where all students are academic, making it easier to adjust the curriculum instead of keeping students at different levels with the same lesson plan. Western Governors University (2019) explains technology's negative impact on youth. From shorter attention spans, increased risk of privacy breaches, obesity, poor social skills, depression,

and lower academic grades. This idea may sound confusing when taking into account all the good technology can have on students, but the difference is how it is utilized. Suppose technology is in a classroom where the teacher has limited knowledge of effectively incorporating it within lesson plans. In that case, it will not be as beneficial to the students. Unfortunately, we also see children hiding behind computer screens instead of interacting, going on unproductive apps when they rush through PowerPoint lessons, and even getting depressed when they do not finish a task immediately or have that instant gratification.

Conclusion

Technology is incredibly impactful in students' development. When used under the right circumstance and supervision, it can be extremely helpful and motivate students to continue learning about certain subjects. However, compelling studies have shown positive associations between elementary literacy and technology. There is insufficient concrete evidence to say this is the best way to educate young minds. Technology can be a real asset in the classroom when utilized correctly by teachers. However, in most cases, teachers are taught how the programs operate but do not focus as much on how to use them in lessons. As much as educators teach students how to use technology as a tool, the education system should also have in-depth training with all faculty on incorporating it into everyday lesson plans.

CHAPTER 5

DISCUSSION

The results indicate that technology is a prevalent factor in children's life whether we oppose it or not. Technology is the way this future generation receives and interprets all information. Technology can positively impact students' critical thinking and literacy when introduced in the proper environment. This study demonstrates the correlation between faculty knowledge of integrating technology and the student's ability to utilize the tool of technology to the highest potential.

The results might suggest that no matter how technology is introduced, it can always be beneficial. However, based on the findings of similar studies, it is more plausible to believe that technology is only as great of a tool as how you teach it to be. When first researching this topic, I thought there would be a plethora of sources to explain my claim, but I soon was disheartened. There was not nearly as much research as I initially thought there would be, considering the number of funds our government grants the schools to continue growing the amount of technology in classrooms. Yes, there are positive associations with technology, but there are also a fair amount of studies that show how technology can be more of a hindrance than a tool. As much as instant gratification can keep children engaged and excited to move on and challenge themselves, it can discourage children when they do not get the answers right away and turn them off from learning altogether. In addition, many teachers are not fresh out of college and have always taught in a traditional form until recent years, when technology has become more and more prevalent. With this switch of priorities from paper and chalkboards to smart boards and tablets, conventional training must be provided for all staff to be on the same page. So then,

the students can understand how to use it effectively versus how they may use similar/same technologies at home and break that wall between a tool and a toy for leisure.

REFERENCES

Charles Nechtem Associates, (2021). *The impact of technology on children.* https://www.cerritos.edu/hr/_includes/docs/August_2021_The_Impact_of_Technology_on_Children_ua.pdf

Clarke, L. W. (2020). Walk a day in my shoes: Cultivating cross-cultural understanding through digital literacy. *Reading Teacher, 73*(5), 662-665. https://doi.org/10.1002/trtr.1890

Eutsler, L. (2021). Making space for visual literacy in literacy teacher preparation: Preservice teachers coding to design digital books. *TechTrends: Linking Research & Practice to Improve Learning, 65*(5), 833-846. https://doi.org/10.1007/s11528-021-00629-1

Eutsler, L., Mitchell, C., Stamm, B., & Kogut, A. (2020). The influence of mobile technologies on preschool and elementary children's literacy achievement: a systematic review spanning 2007–2019. *Educational Technology Research & Development*, *68*(4), 1739–1768.

Jones, V. R. (2017). bridging integrative STEM communities: schools. *Children's Technology & Engineering*, *22*(2), 24–26.

Paek, S., & Fulton, L. (2021). Digital Science Notebooks: A Tool for Supporting Scientific Literacy at the Elementary Level. *TechTrends: Linking Research & Practice to Improve Learning*, *65*(3), 359–370.

Putnam, R. S. (2016). Technology versus teachers in the early literacy classroom: An investigation of the effectiveness of the Istation integrated learning system. *Association for Educational Communications and Technology*, *65*(5), 1153-1174. https://doi.org/10.1007/s11423-016-9499-5

Saro, M. (2019). *Is technology good or bad for learning?.* [Blog] Brown Center Chalkboard. https://www.brookings.edu/blog/brown-center-chalkboard/2019/05/08/is-technology-good-or-bad-for-learning/

Smith, J. (2021). Indiana's uniform school system: The right to literacy, and remote learning in a pandemic. *Brigham Young University Education & Law Journal, 2021*(1), 51-93.

Spooner, F., Kemp-lnman, A., Ahlgrim-Delzell, L., Wood, L., & Davis, L. L. (2015). Generalization of Literacy Skills Through Portable Technology for Students with Severe Disabilities. *Research & Practice for Persons with Severe Disabilities*, *40*(1), 52–70.

Strom, A. (2021). *The negative effects of technology for students and educators.* [Unpublished master's thesis]. Northwestern College. https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1322&context=education_masters

Taylor, D. B., Handler, L. K., FitzPatrick, E., & Whittingham, C. E. (2020). The device in the room: Technology's role in third grade literacy instruction. *Journal of Research on Technology in Education*, *52*(4), 515–533.

Team, T. E. (2020). *K-12 Teacher tenure: Understanding the debate.* Resilient Educator. [Blog]. https://resilienteducator.com/classroom-resources/k-12-teacher-tenure-understanding-the-debate/

Tracey, D. H., & Young, J. W. (2007). Technology and early literacy: The impact of an integrated learning system on high-risk kindergartners' achievement. *Reading Psychology, 28*(5), 443-467. https://doi.org/10.1080/02702710701568488

Vygotsky, L. (1978). Mind in society: The development of higher psychological processes. *Cambridge, MA: Harvard University Press.*

Western Governors University (2019). *Impact of technology on kids today (and tomorrow).* https://www.wgu.edu/blog/impact-technology-kids-today-tomorrow1910.html#close