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Balancing Screen Time: Teaching To The Whole Student

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BALANCING SCREEN TIME: TEACHING TO THE WHOLE STUDENT

by

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"…Advancing technologies as both our savior and our doom."
-Josh Gad voicing Olaf from Frozen 2

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CHAPTER ONE

Introduction

In a technology driven world, I often wonder where the balance is between the utility of technology tools, such as smartphones, tablets, or computers, and the social and health implications of the intense use of these technologies. On the one hand, smartphones, tablets, and other like devices, deliver information at the touch of our fingertips in ways only imagined just a few decades ago. The use of these technologies has greatly increased our capacity for research and learning new information. Because of this speed and efficiency of accessible information, along with the ability to reach anyone at any time, it seems that most of the population has a smartphone, and a growing number of people also have tablets or laptops that they can take with them anywhere. This phenomenon of constantly being accessible and "plugged in" is no different for our school-aged kids, and often even impacting younger kids as well. I think it is time to take a hard look at the potential consequences of students always being connected to these devices. What does this mean to child development and mental health? And what are the consequences, good and bad, for learning and education? It is through this lens that I explore my essential question: *To what extent should student screen time be managed to maximize learning?*

More and more students are equipped with the ever-transportable smartphone and or tablet. According to an NPR article entitled, *Its A Smartphone Life: More Than Half of U.S. Children Now Have One,* fifty-three percent of children in the United States own a smartphone by the age of eleven and eighty-four percent of teenagers own a smartphone (Kamenetz, 2019). Smartphones in the hands of kids allow a lot of information and different applications available for kids at the touch of a button twenty-four hours a day,

seven days a week. This means that students can be “plugged in” at any time day or night. Without any parental controls, this can mean that they have access to any type of platform, even communicating with strangers. Between communication via texts, various social media apps, as well as phone calls, kids are interfacing digitally with information, people, and screens more than at any point in history.

This introduction will serve to narrate the events in my life that led me to the topic of how learning is impacted by continual use of smartphones and other personal devices such as tablets or laptops that keep all of us always reachable and always plugged in. I will examine and explain how my mind-set and practices around smartphones and other personal devices have changed over time through both personal and academic experiences. In this introduction, I will be using pseudonyms when discussing experiences and interactions with people in my life; this will be done to protect the identities of those individuals. I will then discuss the importance of this examination in the context of student well-being and the impacts that may be unintentionally realized for student learning. Ultimately, I will provide and clarify the rationale for this examination and capstone project.

Background: Personal Experience

It was the fall of 2009, and I had just started my freshman year of college and was missing my best friend who was a senior in high school. I was so excited to plan a weekend back to my hometown for the high school homecoming football game. I would be able to see so many of my friends at the game, and then I had plans to hang out with my best friend after the game. After the game ended, we went out to eat. I started on catching her up with my new experiences at college; however, even though we were

sitting right across from each other, I felt so disconnected from her. Almost the whole time we were together, she was connected to what was happening on her smartphone. She was texting other people, while barely paying any attention to the person sitting right in front of her. She was barely present.

The year 2009 is noteworthy in the context of the story I have just described. At this point in time, the smartphone that my friend, and many others, including myself, were glued to had only been out for two years (Gilbert, 2019). In that short time, that minicomputer found its way into the hands of so many kids and young adults, whose brains were not fully developed. This lack of presence in favor of her phone, did not only impact my friend, but I had also been equally guilty of doing the same thing to other people. This incident gave me pause, however, and I started thinking about balance in phone use at that time. This occurred in the form of considering etiquette as I socially engaged with others. I did not like how it felt to be spending time with someone who was not present. That is where my consideration for 1:1 devices began, but I would have countless other personal situations that would turn my addiction to my smartphone into a concern with how little I found myself in the here and now.

Background: Academic Experience

I continued my questioning of technology balance, and better informed my understanding of "teaching to the whole student" in the Educational Psychology course that I took as a part of my graduate courses with Hamline University. This course explored so many topics that indirectly lent themselves to my concerns with phone addiction. The largest contribution for a better-informed rationale on my beliefs concerning phone addiction and screen time was the focus on brain-based learning. As a class we had the opportunity to learn about the brain development in children and the vast

implications of child-rearing as well as the implications for education and student learning. We were given an opportunity to examine various topics for our own research project, and because I was so intrigued with brain development and what that means for appropriate developmental practices, my professor introduced me to the work of Eric Jensen, who explores how the brain works and the implications for learning and development in his book, *Teaching with the Brain in mind.* This book also contains an investigation of the implications for teaching and for schools in general. (Jensen, 2005). Reviewing Jensen's research really made me understand what it means to think about the whole student and what may be appropriate developmentally for all students. Considering the whole student through this research called into question, what is the balance when it comes to technology and the student brain?

Background: Professional Experience

During my student teaching assignment, I had an opportunity to sit down with my high school history teacher, Mr. Anderson, and catch up. This is a fellow teacher I have respected greatly and is ultimately the example I had wanted to follow as I pursued my dream of becoming a high school social studies teacher. I had the opportunity to reflect on some of my high school experiences as well as some of Mr. Anderson's experiences in the field of teaching.

As we discussed various topics that we were both now able to relate to, Mr. Anderson shared something with me that really stuck with me these last few years. He recalled what it was like to walk into the classroom just seven years before this conversation took place; it was typical that he had to take some time to quiet students down before he could begin the lesson. We were teenagers; we had a natural inclination to be social with each other face to face. Now when Mr. Anderson walked into the

classroom, it was quiet; People were on their phones. Sometimes still being social with one another, but presumably many were also simply disconnected from the physical world around them in favor of connecting to the virtual world of endless scrolling through social media. According to Common Sense Media (2018), “Seventy percent of teens use social media multiple times a day (up from 34 percent in 2012) with 16 percent saying they use it ‘almost constantly’ and a total of 38 percent saying they us it multiple times an hour.” As a teacher, I have seen this similar phenomenon take place in the classroom, and it makes me wonder if this is impacting learning or social/emotional development.

Another opportunity I took advantage of during my student teaching experience was visiting the classrooms of other teachers to get strong observations of different teaching styles in practice. I saw and learned a lot conducting these observations. Classrooms with strong classroom management showcased more learning and respectful behaviors, which comes as no surprise. I would primarily see students engaged, interacting with one another, the learning materials, and the teacher. One of the big behaviors I saw in poorly managed classrooms was heavy use of smartphones and a general lack of participation in the learning from the students. This would often occur when the lesson was more teacher-centric and less of a social, student centered lesson. In one of the most distracting classrooms, I saw most kids with their smartphones out while the teacher was attempting to read from a book to the class. I leaned over and asked one of the students what the classroom policy regarding cell phone use was. The student proceeded to explain that there was no rule, and that there really should not be, as the teacher cannot really control that anyway. In contrast to this experience, those teachers

with better classroom management, in which I observed more learning and participation, had policies that requested cell phones not be out during academic time. I saw more learning activities with fewer students distracted by what was going on with their phones.

Rationale of Exploration:

Most teachers and parents want the best educational experience for students. We want kids to develop appropriately with what makes sense for their brain development, socially, emotionally, academically, and ultimately to get the best out of the learning opportunities throughout their schooling. When kids are engaging with various apps and components on their smartphones or tablets, we must consider what is occurring from a cognitive perspective. These technologies have only been available to the masses for a little over a decade (Gilbert, 2019). Yet, we are already seeing unforeseen consequences for children that impact learning.

It is not a secret that student learning is impacted positively by school engagement, or focus, and adequate sleep (Jensen, 2008). If these factors are compromised, we are setting our students up to achieve less in learning environments. When students are bringing their smartphones into the classroom, their focus is often split, and they are not getting the most from the classroom experience (DeWeese, 2014). Sleep cycles are negatively impacted by smartphones, tablets, and other light emitting screens (“Blue Light has a Dark Side”, 2020). When sleep is impacted, learning is not at its best. It is also no secret that when sleep is consistently interrupted, people can easily become anxious or even depressed, impacting their mental health and ability to maximize learning (National Sleep Foundation, 2020).

According to the CDC, childhood depression and anxiety rates have increased from 5.4% in 2003 to 8.4% in 2011-2012. (Center for Disease Control, 2020). While there are many factors that play into this increase of anxiety and depression for children, I think we need to examine the growing lack of presence students are experiencing in their world due to screen time and 1:1 technology as a contribution. This examination would have implications in learning and helping the whole student succeed. If we are not factoring in the whole student, classroom engagement and learning retention for all students may be suffering, especially for those already at risk for underperformance. If we want our students to be fully supported and achieve their best and highest potentials, we, as a community of teachers, administrators, students, parents, guardians, etc, need to investigate the proper balance of technology use, especially smartphones and tablets. We need to continue to ask the probing question: *To what extent should student screen time be managed to maximize learning?*

Summary

Throughout my later teen years and early adulthood, I have had many experiences that have shaped my views on balance in the world of technology, especially around smartphone and tablet use. I have reviewed personal experiences, feeling socially disconnected from friends. I have summarized professional experiences with observations that made me think about connections between smartphone use and implications for the classroom, as well as academic experiences that have informed some of my views from a more research-based understanding.

With this context in mind, I will be exploring the unintended consequences of screen time and constantly being plugged in, with a heavy focus on smartphone use. In

Chapter Two, I will be conducting a literature review to develop an understanding of these consequences and to better inform what balance should look like for our students with regards to engagement, learning retention, and creating the best learning situation for our students with a heavy focus on mental and physical well-being. In Chapter Three, I will be detailing my project plans to showcase critical information from my literature review. This will come in the format of a website and will address my capstone question while including the research conducted during my literature review. And finally, chapter 4 will serve to analyze and reflect upon my project as I refine my paper and launch the corresponding website. I will review key learnings, implications from the results of my research, and expound upon this study through an examination of what future research could bring forth as a result of this study.

CHAPTER TWO

Literature Review

Introduction

While it is true that technology serves many functionalities that enhance our classrooms and educational experiences, a critical examination of screen time is crucial for the benefit of our kids, our classrooms, and ultimately our society. Schools play a key role in educating young students to become well educated young adults and then preparing those young adults to become lifelong-learners and contributing members of society. If the primary objective of school is student learning, then it is up to the schools to create an environment in which learning is maximized. Additionally, it is important that parents and guardians also have a line of sight into how to support their learning and developing child and understand if the school is properly supporting their child as well. I hope to find answers in this literature review for my research question: *To what extent should student screen time be managed to maximize learning?*

For purposes of this literature review, I will be defining screen time as any amount of time one spends using his or her smartphone, primarily; however, other media-delivering devices such as tablets, laptops, and televisions will also be a part of this literature review. When examining standards around the balance of using these devices, it is important to weigh the consequences against the utility of these technological tools. Feeding into my central research question will be the following questions: What amount of time in front of these screens is appropriate for children? With the accessibility of gaming apps, social media, and everything else out there on the internet, how is this continuous plugging in impacting students? Are there any concerns for mental health and

well-being? Are there any consequences for focus and retention in and out of the classrooms? This chapter aims to discover answers to these questions as they relate to student development, learning, and well-being.

To best answer these questions, I will first examine the functionalities and processes that must occur in the brain to experience learning. This will help to aid an understanding of how learning takes place for our students, and what environment and stimuli may help to maximize that learning. Following this examination, I will provide insights from selected literature around how screen time may impact different aspects of the learning process with considerations for focus, sleep, brain development, and mental health.

Brain Development and Cognition

The human brain is incredibly complex and is designed to develop and learn throughout one's life (Jensen, 2008). Focus and retention are critical components of the learning process and proper support for these components include sleep and environments set up to aid in student engagement (Jensen, 2008). Smartphones and other similar, addicting screen-based technologies are impacting student learning. On the one hand, access to information has never been more convenient; yet students are now seeing greater challenges with fully engaging in the classroom. A high-level examination of the human brain and cognition is important to fully understand how screen time is impeding on the focus, retention, and ultimately the learning process.

Cognition refers to the brain's capacity to learn, think, make decisions, analyze, recall facts or memories, and other similar functions. All the factors that feed into

cognition are simply different types of learning. In *Teaching with the Brain in Mind,* Eric Jensen (2005) divides learning into two main categories: implicit learning and explicit learning. Explicit learning is defined as information consumed by the brain through reading, writing, and talking; this can take the form of books, lectures, pictures, organized learning activities, videos, etc. (Jensen, 2005, p. 33). This form of learning inherently takes more focus with an active mindset, a mindset that can easily be side-tracked or completely derailed if one is also attempting to focus on anything outside of the learning scenario. While this is not limited to a text from a friend or a social media post, these screens have certainly become a significant factor of distraction.

Implicit Learning is defined by the information learned through more informal experiences, habits, games, experiential learning, and other "hands on" activities (Jensen, 2005, p. 34). Certainly, if children are connected to their smartphones or tablets, rather than engaging in these implicit learning activities, there is less natural and comprehensive indirect learning occurring. This is a matter of how kids are spending their time outside of school hours. If that time is spent mostly in front of a screen, then they are playing less, interacting less directly with other kids, and spending less time outdoors. Children simply do not have the same amount of time to learn through these other forms of implicit learning outside of the organized school day. While there are some situations in front of screens that offer up learning, we know that most teenagers say that screens, especially social media, distract them from doing homework as well as paying attention to the people in which they are spending their time (Common Sense Media, 2018).

Regardless of the different categories of learning, Jensen (2005) advises that complete learning does not take place unless the information passes through the following three processes for the students:

1) "Identify or predict the relevant associations among variables in the learning situation." (p.34)
2) "Predict and express accurately the appropriate concepts or actions." (p. 34)
3) "Store, retrieve, and apply that prediction in context next time." (p.34)

Neurologically, connections are made at the synapses, or spaces, between neurons; this plays out in memory formation (Jensen, 2005, p. 34). The type of formal learning that takes place in school is more complex and requires hundreds of thousands to millions of neural connections (Jensen, 2005, p.34). This is what must occur in the brain for higher-order thinking skills (Jensen, 2005, p.34). In other words, learning is a complex process and requires focus and attention to create these neural pathways that commit newly learned material to memory. If students are distracted by addicting apps on their smartphones, this complex learning will experience gaps in the process of learning, and depending on how students are using their phones, this interruption could occur at any point in the learning process, and if every student is interrupting their learning process at different points in the learning, how can a teacher recover that experience for each student? Being fully engaged is vital for learning and memory, and from memory to making meaningful connections with new learning experiences.

Committing learning to memory may start with a learning experience during the day, but the process is largely processed by night. According to the Division of Sleep Medicine at Harvard Medical School (2007), learning and memory occur through

acquisition, consolidation, and recall. Sleep is critical to all three of these cognitive events (“Sleep, Learning, and Memory”, 2007). Acquisition is the experience of the learning event and occurs when one is conscious; this transpires at its fullest when a brain is well-rested to maintain focus and learning efficiency (“Sleep, Learning, and Memory”, 2007). Consolidation occurs at night and is the process by which memories are stored and become stable through chemical interactions via the recycling of proteins (National Sleep Foundation,2020; “Sleep, Learning, and Memory”, 2007). Recall is the process of retrieving the learned information consciously or unconsciously (“Sleep, Learning, and Memory”, 2007). This recall is not only important for the initial learning event, but also is highly valuable in making meaningful connections to other learning events as well. Accurately retrieving the new information through recall is most successful if acquisition and consolidation occur successfully. This part of the learning process will come up again later in an examination of how screen time impacts sleep. Knowing the critical nature of sleep in the learning process is vital to the overall conversation around screen time and learning.

Another important factor in learning and brain development is the process of pruning, which is the brain’s way of removing unused connections in the brain (Jensen, 2005, p.11). The brain makes important neural connections to learn and simultaneously prunes away those connections no longer valuable, which enables the brain to be more adept and efficient for developing and learning (Jensen,2005, p.11). According to Michael Rich, as cited in Debra Bradley Ruder’s Harvard Research: *Screen Time and the Brain,* the growing child with a developing brain needs the opportunity to interact in the world in diverse ways with both online and offline interactions, along with the ability to

be bored and allow the mind to wander. Rich contends that this space to allow the child's mind to wander allows for creativity and imagination to occur (Rich, as cited in Ruder, 2019). This diverse pallet of experiences, reflection, imagination, and creativity all play into the way in which the human brain makes those neural connections as well as properly prune unused connections. In other words, how kids spend their time, literally shapes their brain and neural connections. In child rearing and in classroom teaching, it is important to consider the brain when choosing learning experiences and activities with which children engage (Jensen, 2008). While screens may be useful at times, the balance of unplugging and engaging in many different types of experiences is vital to creating a creative brain with a learning mind-set. When considering the degree to which screens should be managed to maximize student learning, parents and teachers alike should heavily consider ensuring that young learners have a myriad of different learning experiences beyond screen time. This will help to shape and prepare the brain to be capable of experiencing a variety of learning experiences, skills, and capabilities while maximizing student potential.

Screen Time and Focus

Now that the cognitive functions about how learning occurs has been explained at a high level, what does this mean for the impact of screen time on focus? When one walks into the modern classroom, it is highly likely that one will be witness to students on and off their phones while attempting to also participate, or sometimes appear to participate, in the lesson activities of the classroom. This is especially true of middle and high school aged students, who, according to a student survey conducted, reported that

ninety percent of the surveyed students advised that they text friends and family in the classroom (DeWeese, 2014).

Can the teacher really compete for the attention of a teenager who has access to so many stimuli right from their smartphone? In other words, are teenagers truly multitasking? Linda Stone (1998) would argue that much of what students, and the broader society, are engaging in is Continuous Partial Attention. This is different from multitasking in that the individual is only partially paying attention to a variety of different stimuli (Stone, 1998). In the case of the student in the classroom who is on their phone reading texts, scrolling through social media, and attempting to also engage with the lesson activities in the classroom- there is no one stimulus that is receiving the full attention needed to fully focus and absorb all the necessary information. This behavior is what classroom teachers are up against when competing for the focus of the students. By nature, teachers have always been competing with other distractions to engage classroom students; this is not a new phenomenon. However, with the advent of smartphones, the fight for full attention has become exponentially more challenging, even beyond the classroom. Student attention is pulled away from so many different life experiences, which also speaks to losing out on the full value of implicit learning as well (Jensen, 2005). If schools should be a place of maximizing both explicit and implicit learning, then allowing students to have their smartphones on their person at any given time is directly contradicting this goal.

If it is common that many students could be impacted by the concept of this Continuous Partial Attention as outlined by Linda Stone (1998), the question is: why? According to an informational blog post, *Dopamine, Smartphones & You: A Battle For*

Your Time, written by Tevor Haynes (2018), a research technician in the Department of Neurobiology at Harvard Medical School, when students engage with their screens through social media or texts, this triggers a release of dopamine, triggering an award pathway in the brain. The apps on smartphones today are structured like slot machines in that they trigger a variable reward pattern to keep a person engrossed with the application (Haynes, 2018). The gaming and social media applications as well as the process of texting are designed to draw a person in and keep them using the apps more and more for a stronger dopamine response (Haynes, 2018). Because of this dopamine release, it is no contest for the students; they are wired to engage with their phones as much as their environment will allow them. In other words, without controls and proper balance exercised by students, the very nature of checking in and staying plugged into the phone at regular intervals becomes addicting to the human brain.

It is not difficult to understand that when one engages with people of any age screen-time addiction, especially smartphones, is common amongst people of the modern-age. What does this mean when we begin giving young children smartphones or tablets with no controls around use? In an NPR Interview with Adam Alter (2017), Alter suggests that technology addiction that often occurs with the use of applications through smartphones or tablets is a behavioral addiction that will trigger the brain to behave in much the same way that a heroin addict's brain works when they are awaiting their next fix of the addictive drug. When children experience this from a young age, the behavior is instilled in them unconsciously. Connect this with the way in which the brain is shaped through growing neural connections from learning and experience as well as how the brain naturally focuses by removing unused connections through pruning (Jensen, 2008;

Rich, as cited in Ruder, 2019). A brain addicted to smartphone apps, in which many of the brain's resources are dedicated to focusing on this addiction, will greatly impact how the brain is shaped and what the brain is focused to achieve. When learning something new takes so much focus and cognitive processes, it is unlikely to be beneficial to wire the brain to practice continuous partial attention or for continuous dopamine responses. How the brain is shaped and trained impacts development and future learning (Jensen, 2005).

The alteration of neural connections is substantiated by others who have researched screen time and education. In her thesis, *Screen Time, How Much is Too Much? The Social and Emotional Costs of Technology on the Adolescent Brain,* Katherine Lynn DeWeese (2014) argues that students who are continuously engaging in attempted multi-tasking with their screens are making shorter neural connections and decreasing one's ability to think critically. In DeWeese's research, she conducts surveys of students in a 1:1 iPad learning environment, who also own cell phones, and are plugged into their devices consistently throughout the day (DeWeese, 2014). Her findings from the survey yield many interesting findings that back up the concept of continuous partial attention as coined by Linda Stone (1998). The students in the survey all advised that it is considered polite to respond to texts within two hours or less, and most respond almost instantly upon receiving a text (DeWeese, 2014. p.29). This highlights the addictive nature of the features on smartphones with connections to a world not physically present from the one in which the user finds themselves.

Additionally, a vast majority of the students advised that when they are bored, they check for texts (DeWeese, 2014, p.29). Rich, as cited by Bradley Ruder, advises on

the importance of letting the minds of children wander when they are bored to promote creativity and imagination. DeWeese (2014) argues that being connected to one's phone dampens one's ability to develop critical thinking skills. Now that kids are filling that void with checking for texts, they are missing out on an important factor that helps with creative brain development.

That is not to say that all use-cases for smartphones, tablets, or laptops are negatively impacting the learning experience. DeWeese also surveys the teachers through her research, and some of the teachers were able to describe some benefits of using iPads and phones in and out of the classroom. One impactful use case is the ability to research quickly and leverage collaborative, engaging tools for educational purposes. (DeWeese, 2014, p 35-41). Collaboration and flexibility to work on collaborative projects or receive feedback digitally from the teacher while working on a project has been highly beneficial to those who need more flexibility when they work on assignments. While there are great benefits of leveraging these technologies to accomplish learning tasks, the discernment about the types of projects and frequency of use is important to reflect on. Many more of the surveyed teachers have concerns about students always being plugged in, unable to get away from school, unfulfilling social activities leading to addiction to technology and anxiety (DeWeese, 2014, p. 35-41). Students are having greater challenges focusing more holistically on the learning experiences in the classroom with the increased desire to leverage iPads and phones for texting, social media, and addictive apps. Teachers cannot possibly compete with all these stimuli.

A large component of learning is memory and recall of the material learned. There are three primary opportunities to support learning of new material: first is the

original presentation of the material, second is the continued engagement with the learning experience, and the third opportunity to support this learning is during retrieval (Jensen, 2005, p. 125). Knowing the addictive nature of anticipating and responding to a text, as established in the screen time exploration by DeWeese (2014), students are now frequently experiencing interruptions in the learning process. By allowing smartphones in the classroom, even for the best intention of using them for educational purposes, the environment has become one of intense competition for student focus that is challenging to overcome. Without the full focus on the learning materials, memory recall is challenged. The cognitive phenomenon that occurs in much of our learning starts with short-term memory (Jensen, 2005, p. 132). Information that goes into short term memory only lasts for 5-30 seconds before it is forgotten or reactivated (Jensen, 2005, p.132). Therefore, it is critical for students to remain focused on the learning in the classroom to experience new information enough to be reactivated and locked into memory, rather than be forgotten. If students are checking their texts, conducting the social media scroll, or playing games on addictive applications, their learning is fragmented at best.

According to Ellen Rose (2010), "…the online computer provides more than just the opportunity for diffused attention: it also gives rise to a compulsion to connect." Even college students who are taking online courses admit that when they are using their computers to read academic information, they easily get distracted with other applications that compete for their time, and they must continually circle back to the more pertinent school related task (Rose, 2010). These are young adults whose brains are closer to fully developed than the k-12 students that is the primary focus of this examination. The college students are also more than likely paying for their courses, and yet they still

experience high competition for their focus in educational settings. Unrealistically, there is an expectation that teenagers in high school and younger children remain focused on the learning tasks with all these distractions working against their learning, when college-aged students cannot manage that even with being further along in their brain development and financial incentives to do so. These screens and applications can wire one's brain to become addicted to the apps (Alter, 2017; Haynes,2018), literally wiring one's brain to not pay attention to the world right in front of them, which is what can and does happen with school-aged students. Therefore, it is critical to manage and teach kids how to avoid this addiction and allow their brains to fully engage and focus on important social connections and learning opportunities. To ensure this occurs, important adults like teachers, parents, and guardians must help manage this process and help teach students the various ways that screen time may be impeding on various aspects of their lives.

Screen Time and Retention

Sleep and Learning

It is not just that smartphones, tablets, and other similar technologies create an environment in which students have a challenging time with maintaining focus on any one stimulus, this issue is also impacting retention of new knowledge as well. One of the critical components of memory and retaining new information that is acquired throughout the day is sleep.

According to Dr. Kennedy, a clinical psychologist, adequate sleep is "the body's time to repair the damage of the day, regulate hormones, consolidate memory, solidify learning and restore energy so they can wake up and do it all over again the next day." (Kennedy, 2016) If sleep is critical to memory and synthesis of new information, it is safe

to say that sleep is critical for the learning process outlined by Jensen. To complete the learning process, it is critical that sleep occurs for neurons to recycle proteins to lock in what was learned during the day (Jensen, 2008, p. 43). Not only is sleep critical for the learning process, but the consequences of not getting adequate sleep can be detrimental. According to the Suni (2020), not getting enough sleep can impact the development of the frontal lobe, which is responsible for impulsive behavior. A continuous lack of sleep can lead to high-risk behaviors and behavioral problems. Additionally, Kennedy (2016) asserts that anxiety levels increase when one does not get enough sleep, as adrenaline and cortisol levels increase, which can make one "feel wired, edgy, and stressed…And stress hormones make it harder to fall asleep, creating a cycle of sleep debt that is hard to break out of." It is critical that students are getting adequate sleep for the learning process and for mental and physical health.

What does this have to do with screen time and impacts to learning? According to a letter published by Harvard, *Blue Light Has a Dark Side* (2020), light of any type can suppress the natural melatonin levels of an individual, but this is especially true of blue light; blue light is the type of light emitted from smartphones, tablets, laptops, televisions, etc. Blue light, especially looked at in 2-3 hours of bed, has been found to deeply interrupt the sleep cycle and negatively impact one's circadian rhythm ("Blue Light has a Dark Side", 2020). In DeWeese's research on screen time, ninety-five percent of the students confirmed that they used some form of personal 1:1 technology before bed (DeWeese,2014, p.32). Not only is learning being fragmented by students engaging in continuous partial attention, a term coined by Linda Stone (1998), with their cell phones and tablets during the learning experiences in classroom, the synthesis and retention of

this new information is also being impacted by interrupted sleep cycles as well. Additionally, students likely have a difficult time focusing as it is, given they are feeling groggy and sleep from not getting enough sleep to begin with.

Not only is blue light from screens a stressor to one's circadian rhythm, but screens also keep one's brain engaged and stimulate the brain, according to the National Sleep Foundation (2021). This type of stimulation will prevent one's brain from relaxing as it engages with exciting apps, games, or higher-level thinking in response to communications or schoolwork. There is also a lot of content online that can evoke strong emotions, which can also make it more challenging to get into a restful state leading up to bedtime (National Sleep Foundation, 2021).

When kids experience deficient sleep patterns, they experience less consolidation of the learning materials from school, which means the new information is not completely being retained or synthesized. Additionally, their drowsiness from lack of deep sleep impedes on their ability to focus the following day. Along with the competition of focus from their smartphones, their brain is tired as well. This creates a less effective learning environment. If schools aim to maximize the learning experience, then it is critical that students learn about and get support from parents or guardians to disengage from screen time, especially in the few hours leading up to bed. For younger kids, this will likely have to be completely managed for them and for older kids it may be a combination of parental management and education for the older kids. Not only does screen time need to be managed to avoid screen addiction, and maximize the learning process through strong sleep hygiene, but there are other considerations for the brain and learning as well.

Screen Time and Other Cognitive Considerations

Screen Time and Child Development

For many kids, the impacts of screen time start long before young children even start school, and these impacts continue through the years. In a longitudinal study that followed screen time use in children aged 4-7, it was revealed that higher screen time use in kids at age four was an indicator of high screen time in kids at age seven (Cadorey et al.,2018). This sets up brain development for addiction to screen time. Those students who had higher levels of screen time, generally experienced negative outcomes on their motor skills. (Cadorey et al.,2018) This means that entering kindergarten and early grade school, there is a physical ramification of excess screen time as well. This is backed up by the phenomenon of the brain being wired through neural connection growth and pruning as outlined by Jensen in 2008. If screen time impacts the connections made in the brain and how brains become more wired to conduct activities in which they are exposed to, then more focus on screens can take away from motor skills. Children begin learning sensory-motor skills early in life, and proper maximization of these systems from birth onward can be predictive of academic success. (Palmer, 2003, as cited in Jensen, 2005, p.24). With increased sedentary screen time in children, these sensory-motor skills can be delayed, which not only impacts different aspects of learning and education as it relates to classroom experiences but can also have physical ramifications for other types of learning throughout life.

Cognitively a child under the age of two should be interacting with their world in a physical, hands-on discovery capacity. These interactions should include connections with caregivers and other children; this helps to develop their language, motor, and

social-emotional skills (Radesky & Christakis, 2016). Toddlers under two are not developmentally ready to learn from screens the way in which they learn from interactions with people and physical connections to the world around them (Anderson, 2005, as cited in Radesky & Christakis, 2016). When young children do enter an age in which they can start interacting with screens and learn from them, developmentally, this is best done in conjunction with their caregivers interacting with the young child. In fact, even in later years, it is advisable that parents help the child connect with the learning by interacting with the media and the child (Radesky & Christakis). The recommendation for screen time in children under two is none if possible, and for children ages two to five it is no more than an hour per day, ideally to allow kids to engage in physical and social activities to help with healthy development (Radesky & Christakis, 2016).

Screen Time and Well-Being

A brain that is best suited for learning is well-rested, rich with balanced nutrition, and in a content state of mind. It is no secret that a student under stress, anxiety and/or depression suffers a lower ability to learn and retain new knowledge (Jensen, 2008). Many factors can play into a student feeling anxious or depressed, and one of those factors is screen-time. In a large, national random sample of children ages 2-17, increased screen time was associated with lower wellbeing in the areas of self-control, distractibility, social connections, emotional stability, and being more difficult to care for by caregivers (Twenge & Campbell, 2018). Higher users of screens even revealed less curiosity, self-control, and emotional stability, where low to no screen time revealed no significant impacts to well-being (Twenge & Campbell, 2018).

A student who has a more content mindset will be better prepared to learn than if that student is not content (Jensen, 2008). According to the CDC, childhood depression and anxiety rates have increased from 5.4% in 2003 to 8.4% in 2011-2012. (Center for Disease Control, 2020). While there are many factors that play into this increase of anxiety and depression for children, screen time is contributing to this by way of disrupting sleep, which can lead to anxiety and depression (National Sleep Foundation, 2020). Additionally, students are experiencing a more difficult time being present and unplugging (DeWeese, 2014). If the concept of the whole student is not being considered, classroom engagement and retention for all students may be suffering, especially for those already at risk for underperformance.

Social Media. It would be difficult to review literature on balance in screen time without a review on social media and how that can impact student well-being and the implications for learning. Social media sites offer ways to stay connected to friends and family. People can connect and share content in fun ways that could not have even been imagined a couple of decades ago. Social media sites and apps are also highly addictive and can contribute to a need to be connected all the time. With the heavy dopamine responses that occur in the brain from getting those likes or reactions on social media, teenagers are easily susceptible to social media addiction (Haynes, 2018). It is no secret that students like to feel connected to others, so social media is a natural draw for them. This phenomenon of connecting to social media to stay connected can lead to anxiety through comparing oneself with others, as well as social isolation through witnessing events that students were not invited to or cannot attend (Tomoniko, 2019). When

students are not feeling connected with others, it is not uncommon to experience anxiety, which can make them disengage and feel distracted with other aspects of their lives.

In *Social Media and Teen Anxiety,* Shafer cites a study conducted by Lenhart from 2015. This study brought out the major stressors that teenagers feel when it comes to social media:

- "Seeing people posting about events to which you haven't been invited"
- "Feeling pressure to post positive and attractive content about yourself"
- "Feeling pressure to get comments and likes on your posts"
- "Having someone post things about you that you cannot change or control" (Lenhart,2015, as cited in Shafer, 2017)

Shafer asserts that there has been a significant increase in anxiety and depression over the last several years, that has corresponded to the timeline that the first iPhone came out. However, Shafer (2017) also points out that these anxieties that teens have been experiencing are normal with their developmental stage. While these anxieties can certainly be increased by social media, correlation is not causation. It is possible that there are also other outside stressors causing increased anxiety and that anxiety and depression encourages teenagers to connect more with social media (Shafer, 2017).

In a systematic review of 70 full text articles, Seabrook, Kern, and Rickard (2016) went through literature from 2005 through 2016 to compile the research on social networking sites (SNSs) and the link to anxiety and depression. There is a link with the quality of interactions on SNSs and mental health. Depression was found to be linked with fewer positive interactions on SNSs and increased negative interactions, while positive interactions led to more positive outcomes for mental health (Seabrook et al.,

2016). Evidence also suggests that people with anxiety and depression are more prone to interpret interactions on SNSs to be negative, even if the interaction may not be intended as or perceived as negative by others. (Seabrook et al., 2016). In this systematic review, it was also discovered that social anxiety was correlated to addictive behavior, while depression was correlated to less addictive behavior; this is likely due to the social withdrawal that occurs with depression (Andreassen, S. et al, 2016, as cited in Seabrook et al, 2016).

While careful consideration needs to occur about not over-simplifying the relationship between anxiety and depression and social media, we also need to be aware of the correlations that do exist. Social media is a tool that can and does connect people in positive ways. On the other hand, social media can exacerbate feelings of social isolation, lower self-esteem, and other anxiety-inducing feelings (Shafer, 2017). Anxiety is also associated with addictive behavior on social media, and it is believed that this relationship is bi-directional (Seabrook et al, 2016), which would suggest that social media use can exacerbate anxiety and vice versa. Here again, it is important to manage and teach kids to use screens and social media responsibly for the overall well-being of the student. If a kid is anxious and distracted by their phones and what is going on via social media, they may not meet their full learning potential.

Conclusion: Implications for the Learning and Developing Student

Through the examination of the impacts of screen time, one needs to decide if the utility of these technologies is surpassed with the unintended side-effects for kids and students. The apps found on 1:1 devices are addicting to students, and operate the same reward centers in the brain that drugs operate in (Haynes, 2018; Alter, 2017). The use of

tablets and/or the allowance of smartphones in the classroom create a place in which students become “walking zombies” that consume their outside world through continuous partial attention, a term coined by Linda Stone (1998), rather than truly focusing on any one stimulus. This lack of focus is creating less engagement with the learning activities in the classroom and has broader implications for knowledge retention and sleep as well, especially as screen time continues beyond the walls of the classroom.

It comes as no surprise that social interaction is important to kids, especially to teenagers. Social media is a way to connect with one’s peers and is a common use case for smartphones. It has been established that social media sites are designed to be addictive and can exacerbate anxiety, which can also lead to more addictive behavior with social media (Haynes, 2018). This is another way in which screen time can be negatively impacting students in and out of the classroom, causing distraction from learning and more positive social experiences. While we should not necessarily write off screens and social media altogether, it is important that students are taught balance and to be aware of how they can be impacted. Teaching this responsibility may help with more balance, focus, and learning in the classroom as well.

Should we remove technology from the classrooms altogether? Probably not, technology is meant to be a tool, and it can serve as an especially useful tool to pull in all different types of valuable resources and media. Technology can certainly enrich a classroom, but we need to challenge the concept of students having whatever they want at their fingertips 24 hours a day, 7 days a week. Perhaps 1:1 devices, especially smartphones, should be kept in lockers. Teachers should engage with technology when it appropriately enhances the learning process, and administrations should make sure that

the school environment is set up to create the most impactful educational experiences that does not create intense competition for the students' attention.

The sources for this literature review were selected to curate sources of credible research that help to explain some of the unintended consequences of screen-time on kids. This is not an exhaustive list, and there are many benefits to using technology in and out of the classroom that are not described in depth for the sake of a concise and focused examination. This literature review is the back-drop to a website containing an on-going blog that will provide resources for schools, parents and guardians, as well as students.

The next chapter, Chapter Three, will serve to thoroughly explain the capstone project: an educational website around responsible technology use in the classroom. This chapter will outline the intended audience, context for the project, as well as describe the theories/frameworks that will inform the capstone project. The next chapter will also describe the timeframe in which the project is to take place.

CHAPTER THREE

PROJECT DESCRIPTION

Introduction

Smartphones, tablets, computers: Various forms of technology can and should be leveraged as an asset in and out of the classroom. Students have access to so much potentially rich content, and there are so many opportunities to teach students how to use this technology to research and pull up credible sources in a responsible way. This rich learning opportunity needs to be balanced with discipline around how screen time is implemented in and out of the classroom. Chapter two provided an overview of the discussions and research that exists around the consequences of misusing screen time, which was aimed at addressing the guiding question: *To what extent should student screen time be managed to maximize learning?*

Chapter three will provide the project overview, which will include a description of the project, intended audience, context for the project, framework and theories used to complete the project, and a timeline of when the project will take place. This will help the reader understand what the project is and how it is intended to be used.

Project Overview and Audience

After reviewing the selected literature on the topic of consequences around misuse of screen time, I decided that I wanted this information to be accessible to everyone who supports students in and out of the classroom. I wanted a platform that was simple to access and could reach a diverse group of people. A website really lent itself to these goals. But I wanted this to be more than a website that people visit one time and they are done. I wanted people to be able to come back to the website for quick little pieces of information that they can learn in a matter of a few minutes. So beyond the

website and larger sharing of curated information, I decided to also create an ongoing blog in order to allow different people to be able to receive little pieces of researched information that they can quickly act upon to help their student, kid, or themselves.

The website, entitled *Screen Time: A Balancing Act*, is a means of communicating the importance of balance and responsibility with screen time for students, especially as it pertains to smartphones and other 1:1 devices. The primary focus of the content is understanding the negative impacts of overusing and misusing 1:1 screen-based technology, primarily to help set and teach boundaries for kids. While the content and purpose of the blog, and website overall, is aimed at helping to set boundaries for kids, the content really is good for all ages.

The intended audience for this website is very wide. The website has a home page, which includes the blog that will be updated once a week with additional resources and content on this topic. There are also separate pages for schools (teachers and administrators), parents, and teenagers as well. Each of these pages has a note addressed to said audience type, and a corresponding video that sums up much of the information that can be found in my literature review in a digestible way. I use a different video created by different groups and researchers for each of the different audience types that I aim to support with this information. The videos address concepts around the addictive nature that exists within texting, social media apps, gaming apps, and the unlimited access to information on the internet (Alter 2017; Haynes 2018). They also address issues with how sleep can be negatively impacted by screen-use in the couple hours leading to bed (Kennedy, J. K., Ph.D. 2016, November), along with how brain development can be impacted by screen-time as well (Rich, as cited in Ruder, 2019).

It was intentional that the audience ended up being so wide to include students, teachers, administrators, and parents and guardians. The reason for this is simple; it really takes all these groups working in concert together to understand why and how to balance technology in and out of the classroom to maximize student well-being and student learning. Students, especially older students, have more control and autonomy when it comes to their phones. It is critical that they are aware of the impacts that phones have on them if they are to help in creating their own balance with healthy technology use. Teachers and Administrators oversee the school learning environment. If the goal of school is to learn and get an education, then creating an environment that is set-up to maximize this experience, and not compete with it is important. Therefore, I include a section for teachers and administrators as well. Lastly, I include a section for parents and guardians. This is especially important for families with young kids, as screen-time impacts milestones in brain development (Madigan S, Brown D, etc. 2018). So, this practice of balance and proper use really does start from the time of birth. Parents and guardians raising kids from birth all the way through young adults need access to this information to help create those practices at home as well.

The portion of this site that is ongoing will be the blog. This section can be found on the home page, and this is where I intend to push out information in bite-sized chunks weekly. I will share resources and current information that is grounded in the research for my intended audience. I will also push out any new, groundbreaking information that is not covered in my literature review. Not only will this section serve to provide easy-to-use resources, but this will also be an area where people can comment and share the information found within the blog posts.

Lastly, there will be a section of the website dedicated to sources. Here is where there will include a link to my larger research paper that can be found within the Hamline digital commons, along with any additional sources for resources used on the rest of the website, as well as the blog. While many will likely not leverage the "Sources" page, it will be beneficial to anyone conducting research, or to anyone wanting to use the resources to make a case for school policy around screen-time.

The website has been launched and the blog has been started effective August 2021. The website will be promoted on LinkedIn, other social media websites, as well as word of mouth. The goal is to share these resources with those who could use them to maximize the learning experience for students.

Project Rationale and Frameworks

Screen time is one of the variety of factors that impacts student learning, but it is an especially important factor to keep in mind for a more thorough learning experience. To lessen competition of stimuli for teachers to have to compete with for student attention, it is important to look at this project through the lens of Haynes (2018) as well as Alter (2017) as they reference and discuss the addictive nature of smartphones, as discussed in chapter two. Couple the addiction factor with the still developing brain, and it is easy to establish an addiction to technology; students deserve a better educational experience. The theory of continuous partial attention, as discussed by Linda Stone (1998), is another framework that will be leveraged in the content of this project. To experience a rich and full learning experience, or any life experience really, one must be genuinely engaged, rather than ingesting fragmented information from several sources in

a short amount of time as experienced when plugging into one's smart phone on and off in an attempt to "multi-task".

Timeline

The timeline for completing this project is the summer of June 2021 through August 2021. As the school year begins in an unconventional era of the Covid-19 pandemic, there will be additional research done on screen time to add to the literature and frameworks for this project. This will be especially helpful for the blog portion, as the goal is to push blog content weekly with new information and resources. The summer of 2021 was dedicated to the creation of the website itself., with a heavy focus on redrafting the first three chapters, as well as creating and finalizing the fourth chapter. Following the submission of the project paper and creation of the website, I will continue to update the blog on a weekly basis with insights and resources for my intended audiences. This is where I will share resources that are grounded in credible sources for parents, teachers, administrators, and students. I will also use this blog section to share any new or ground-breaking concepts that are not covered in the literature review.

Assessment

Due to the limitations of the site being shared primarily by word of mouth, I anticipate a slow start to reaching different people. The idea is that over time, I will see more traffic to my blog. The website offers the ability for me to see metrics on traffic to my site. As time continues, if I am seeing more people come to the website and engage in the blog, I intend to conduct more promotion to the website and increase searchability on search engines. I will also consider getting my own domain name to make my website even more searchable. This will ideally drive more traffic to the website and blog, and

these metrics, which I can see as the website creator, will be an indicator of effectiveness for this project.

I will also use this in future teaching team opportunities. This is something that I intend to share with my peers. The goal here would be to encourage my teaching teams to check the resources on the blog and help them to implement cell phone policies in their classrooms, if they don't already have them. I can then also use their feedback as an informal assessment to determine if the data and information is helpful for them as well.

Summary and Chapter Four Preview

To what extent should student screen time be managed to maximize learning? The key words in this guiding question are *"maximize learning"*. Afterall, the goal of school is to do just that, *"maximize learning."* Chapter three has highlighted the rationale for this project with the goal of contributing to the conversation to help maximize that student learning. If students can unplug from their smartphones, tablets, and other similar technologies, they will sleep better, focus more effectively, retain more information, be more present in the world, have less anxiety, and ultimately learn more. Through this capstone project, information is available to school administrators, teachers, and parents and guardians with tools to help communicate and teach kids responsibility for screen time use. This information has been made available on an easy to navigate website and will be promoted via social media and word of mouth. The website and blog itself will be assessed by website traffic metrics. It will also be assessed through candid feedback from fellow teachers whom I share this with to determine if the website is effective. Now that the project has been discussed, it is time for an overall reflection.

Chapter four will be a space to reflect upon the creation of the website as well as reflecting upon literature review and further research. This will be an opportunity to examine the nature of this project and understand the ways in which the capstone paper and project adds to the literature that currently exists around screen time for kids. Chapter four will culminate these learnings from conducting the research and creating the website and will explore future implications of the research project.

CHAPTER FOUR

Conclusion

Introduction

In our modern world, a myriad of different stimuli is competing for each one of our attention. This concept is not any different for students in or out of the classroom. While competition for our time and attention is not a new phenomenon, it has become a lot more competitive with the ever-increasing presence of screens in front of our faces, especially when it comes to smartphones. School aged kids are now having to make decisions about what it is they will pay attention to: Will they focus on the road when they are driving? Or will they feel the urge to answer that one text that just rolled in? Will they pay attention to that history lesson to be applied later in a test or have longer term ramifications of understanding key societal systems? Or will they be scrolling through their social media page to confirm that their friends liked their latest post? The competition is a real one that, research suggests, can really impact brain development, mental and physical well-being, attention, and learning. Because of these unintended impacts of screen-time, I decided to address the question: *To what extent should student screen time be managed to maximize learning?*

This chapter will address major learnings through the course of my project creation. I will revisit my literature and draw connections with the literature and my project. I will also highlight the key literature that was influential in the creation of my project. I will share broader implications of the creation of my project as well as limitations of my project. Future research implications will be shared, along with how I plan to generally share my project with others. Before concluding this chapter, I will also share the ways in which my project could be beneficial to the profession of teaching.

Project Major Learnings

After conducting my initial literature review of selected research that exists around cognition and how screen-time may impact various aspects of the whole student, I decided that a simple website that includes a blog would be an accessible way to digest and share the information that I found along the way. A major learning that came out of this capstone research and project creation was to start planning the actual project component earlier on in the process. I knew I wanted to create a website and blog, but I had no idea what this entailed, the type of organization that should go into something like this, or how to start. One learning that I would carry on as a piece of advice for anyone looking to go through a similar process is to consider what type of project will lend itself to making your research applicable and accessible to the intended audience.

Another learning that came out of this process was trying to determine what sources to include in my literature review. As you might imagine, the beginning part of any research is finding sources that either address your specific topic or inform your topic. In the beginning, there are a few sources that you likely already have in mind, but from there it can become a very daunting task. The best take-away I realized in this process and would carry with me in future research projects is to spend time creating your annotated bibliography first. Spend time organizing sources and documenting what may inform your paper. It is easier to have too much and have to cut out sources that are not as relevant later. This process really helped when it came to writing my literature review later.

Literature Review Revisited

The literature review is the "meat and potatoes" of the whole capstone project. This is where I brought in expert voices on the brain and cognition, impacts of screens on sleep, learning, and well-being and made connections between different pieces of research and included my own conclusions based on the information presented. The introduction to my literature had a heavy focus on the brain and learning with an emphasis on the learning process found in *Teaching with the Brain in Mind* by Eric Jenson (2005). This was an important backdrop and foundational understanding that was necessary to then further explore the different ways in which learning and other brain functions can be negatively impacted with overuse of screen time. The learning process takes a great deal of focus (Jenson, 2005), and we know that most teenagers say that screens, especially social media, distract them from doing homework as well as paying attention to the people in which they are spending their time (Common Sense Media, 2018).

I also found the study and research of Katherine DeWeese (2014) rather helpful. Through a survey that was conducted with students, DeWeese highlights the fact that students are having greater challenges focusing more holistically on the learning experiences in the classroom with the increased desire to leverage iPads and phones for texting, social media, and addictive apps. Teachers cannot possibly compete with all these stimuli.

The most influential expert that was leveraged in the actual project was an NPR Interview with Adam Alter (2017), Alter suggests that technology addiction that often occurs with the use of applications through smartphones or tablets is a behavioral

addiction that will trigger the brain to behave in much the same way that a heroin addict's brain works when they are awaiting their next fix of the addictive drug. When children experience this from a young age, the behavior is instilled in them unconsciously. Through Alter's research and presentation, I was also able to then draw on the research of Eric Jensen (2005) to incorporate the cognition factors that literally shape one's brain as this relates to child development. While Alter's work does not take up the bulk of my literature review, I argue that his work was most influential, as I was able to leverage a couple of video resources showcasing his research on my blog and other areas of my website. There are several other important works that went into my literature review that highlight important concepts that I will continue to use as a basis for upkeeping my blog and providing resources to parents, teachers, administrators, and students.

Implications and Limitations of Project

The implications of this research and project are really implications of encouragement to a wide array of people. My hope is through the resources that I have shared and will continue to share, that teachers will consider the information and the data and be more purposeful for when and how they implement technology in and out of the classroom. Technology is a tool, but balance is key. My hope is that administrators could take some of this information and create policies around technology use, such as keeping cell phones in lockers unless a teacher has specifically requested that students need them for a very specific and intentional lesson that they are planning. Without a school-wide policy, teachers may have to fight for students to engage in lessons if students are allowed to always have their cell phone on them at any given time. I hope this project will also help encourage parents and guardians, especially of younger students to create a

healthy balance of what screen time should look like and help fight off phone addiction to help shape more well-rounded kids. Lastly, my hope is that some of this information would reach teenagers. They are at an age where decision making and autonomy are very important for them, so they need to have a reason to want to create their own balance with smartphone/tablet use as well.

One of the advantages of this being an ongoing blog or website is that it can easily be accessed and seen by people. The drawback is that it will basically be promoted by word of mouth and promoting it when appropriate. In the short run, I plan to use word of mouth as being a good way to start to share this as a resource. In the long run, as I maintain this project, it might be nice to also promote the website in other ways to make sure that it is findable on google as others try to seek this type of information out as well. This can be leveraged through creating my own domain name for the website and setting up keywords that will pull this site up when the topic is being searched.

Future Research

To add to this exploration, it would be interesting to conduct some sort of study or survey on different types of schools. Some schools lean heavier on technology and allow phones in the classroom. Other schools, such as those schools which take a more classical education approach, have little to no technology use and do not allow smart phones in the classroom. There are schools that also operate in between those two extremes. It would be valuable to have the data on the different categories of schools and understand how the differences in technology policies and use cases correlate to student success. This type of study could really lend itself to providing more tangible insights for administrators and teachers to create the best learning environment for students.

Sharing Project and Implications to Teaching

As mentioned earlier, this project will primarily be shared by word of mouth. As I interact with teachers, parents, students, and administrators, I will be able to share my findings and direct them to my website. When I am teaching in the classroom, I will use some of the resources I have gathered to explain to students why I have a "no phones" policy in my classroom as well. This project can be used for anyone who wants to understand why unplugging from one's phone may help with learning, and well-being in general.

The ideas brought together in my literature review and consolidated on my blog and website add to the conversation around phone use in schools, with broader implications beyond the classroom. With the advent of smartphones, our students are being bombarded with stimuli constantly. The literature does show that being plugged in all the time leads to students engaging in continuous partial attention (Stone, 1998), which leads to experiencing gaps in the learning process. The literature also points to troubles sleeping, negative impacts to brain development, as well as overall issues with well-being. While there are advantages to smartphones, tablets, and screen-based technologies, we in the teaching profession must consider our lesson plans and classroom policies on this topic. It is vital that we consider the proper balance and act with intentionality to help to maximize learning for our students.

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