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How Does The Use Of Technology In The Classroom Impact The Performance Of Students?

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HOW DOES THE USE OF TECHNOLOGY IN THE CLASSROOM IMPACT THE PERFORMANCE OF STUDENTS?

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Abstract

Technology has been an expanding force in education, careers, and personal life for an abundant amount of time in the twentieth century. More and more people use email instead of writing old fashion, mailed letters and many times, ecards are the new greeting cards. I have chosen the topic of technology in the classroom because, as a teacher, I realize that technology is only growing stronger. I believe that technology can be incredibly beneficial to students but can also be just as distracting to them as well. This paper will address the following question: "How does the use of technology in the classroom impact the performance of students?

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CHAPTER I: INTRODUCTION

"Technology has forever changed the world we live in. We're online, in one way or another, all day long. Our phones and computers have become reflections of our personalities, our interests, and our identities" (Labzeyera, 2018, Page 1). In today's world, walking into a classroom is nothing like it used to be. Cellphones, iPads, Smart-boards, Doc cameras and laptops can be seen scattered throughout any given classroom. Is all this technology helping our students, or is it more of a distraction? Are students looking up that article you told them to search on their Chromebooks, or are they just scrolling through their newsfeed or commenting on Sarah's photo of her new car that was just uploaded to Instagram?

As the world becomes more progressive, the dexterity that is needed to acquire and master technology is quickly changing. With expeditious changes in technology, students will need to adopt technology in their future. Implementing the use of technology in the classroom, can help students better prepare for the future. "The whiteboard is almost extinct, while technology has never been of more importance in the classroom. Creating presentations, learning to differentiate reliable from unreliable sources on the internet and maintaining proper online etiquette are all vital skills that students can learn in the classroom" (Himmelsbach, 2019, para. 14). Digital literacy refers to an individual's ability to find, evaluate, and compose clear information through writing and other mediums on various digital platforms. By teaching this in classrooms, students can be more prepared for college courses, careers and beyond.

Instant information is another plus to having technology in the classroom. With the Internet, everything can be updated and changed instantly. New findings and studies can be

found within a few clicks on the Internet. Schools which rely on textbooks have to go through the process of ordering new, updated textbooks and pay hundreds of dollars just for them to repeat the process again in a couple years. Use of the Internet also fosters a more collaborative learning environment for working together on projects. Students are able to network together when unable to find a time to meet in person.

Students are more motivated to learn if technology is involved. There are many informal websites available for students to learn what they need while having fun at the same time. Quizlet, Kahoot, and Prodigy are some examples of websites that make technology fun. Prodigy engages students using adaptive technology to cater to each individual. "It takes game-based learning a step further and provides teachers with a powerful set of reporting and assessment tools that allow them to easily identify trouble spots, differentiate instruction, and better manage classroom time" (Teach Thought Staff, 2019). Switching up devices can keep students engaged and motivated. If teachers continually use the same approach, lessons and lectures start to become boring and repetitive. With so many different options of using technology like computers, Chromebooks, iPads, smartphones, televisions, and digital cameras, students should be thrilled to do something new with technology each day.

Technological Problems

As there are many positives to using technology in the classroom, there also comes with it many negatives. The major ones include distraction, cheating, unequal access to technology, disconnection, and incorrect sources.

If you've been anywhere near a college campus, or high school, you've probably noticed the extent to which students are glued to their mobile devices. What do they do with them

when they walk into the classroom? In one survey, at six different universities, college students reported using their phones an average of 11 times per day in class (Harvard University, 2020). In another study, 92% of college students reported using their phones to send text messages during class (Fried, 2019). While some teachers are banning cell phones and other electronic devices altogether in class, other teachers are trying to embrace their use. What about incorporating social media into your lectures? Whether phones and laptops should or should not be allowed in the classroom, the temptation for distraction is large and spreading. Imagine sitting in the back row of a lecture hall with 100 other people in front of you, either on their phones or laptops, not taking notes. Some may even have headphones in while watching Netflix. According to Fried, "I found that most students using a computer in class spend considerable time on activities not related to taking notes, and furthermore identified a negative correlation between student success in class and in-class laptop use." (Fried, 2019, p2.)

Along with distraction comes cheating. With technology at students' fingertips at every turn and answers within seconds, technology makes cheating too easy. While smartphones are growing progressively, which is seen as a positive, teachers and professors see this as more of a negative impact when it comes to the school setting. One of the most popular and easiest ways for students to cheat in classrooms is by taking out their Smartphone and snapping a photo of a classmate's work, enabling them to copy homework word for word. Technology also makes it easy for information to spread quickly. Teachers will need to teach students how to find information online from reliable sources, not just copying and pasting opinions randomly posted online. Once you post information on the Internet, whether it's true or not, there's no

taking it back. Students have not quite comprehended this yet and need to be taught how and why you shouldn't believe everything you read and see on the Internet. Students could be writing a paper with incorrect sources, causing them to learn false information.

Unless the school is able to send the technology home with students, homework assignments which are dependent upon technology become difficult for disadvantaged students (family, social, or economic circumstances that hinder their ability to learn at school) to complete. "As of 2016, there were still 15% of homes that did not own some form of a computer" (Lewis, 2015, p.2). Forcing students to travel to a library or some other location for computer access creates more of a time-commitment when these may already be issues for them at home. "Progressive technologies in the world have always seemed to be divided between those that have and those that have not" (Deneroff & Walker, 2001 p.23). Students that are able to experience and use the technology generally have a better experience than students who are unable to use technology. While access to the Internet is provided free to anyone at certain locations, not everyone is able to get to those locations. Students who do not own a car, live too far away to walk, lack time and money prevent access to the Internet or technology. How can equal access to the Internet and mobile technology be achieved? Many schools have iPads and Chrome books for students to use for the year. Some of those students even get the luxury of taking them home. But what about the schools that don't offer iPads and chrome books for students? Is it an issue of needing more funding? Or does that just open up a whole other discussion? So many questions but few answers for equity and technology.

Overall, there are many pros and cons to using technology in the classroom. As mentioned above, engagement, instant information, participation, differentiated instruction,

and preparing students for the future are some of the major pros. Distraction, unequal access, cheating, cyberbullying, and physical and health concerns are the major cons to using technology in the classroom.

Definition of Terms

Chrome book: A laptop or tablet running the Linux-based Chrome OS as its operating system. The devices are primarily used to perform a variety of tasks using the Google Chrome browser, with most applications and data residing in the Cloud rather than on the machine itself.

Computerized Testing: A form of computer-based test that adapts to the examinee's ability level. It is sometimes referred to as Tailored Testing.

Educational Software: A term used for any computer software which is made for an educational purpose. It encompasses different ranges from language learning software to classroom management software to reference software, etc.

Interactive Learning: Hands-on approach to help students become more engaged and retain more materials. With or without a form of technology, interactive learning helps students strengthen problem solving and critical thinking skills.

Interactive Whiteboard: A large, interactive screen that connects a computer and a projector. The user can control the computer by using a special pen, finger or another tool to touch the screen of the interactive whiteboard. Normally, Interactive whiteboards are fixed on walls.

iPad: A tablet computer developed by Apple. It does not include a keyboard or a trackpad but is all touchscreen.

Laptop: A computer that is portable and suitable for use while traveling.

SMART Board: SMART Board is the brand name of an interactive whiteboard.

Technology: Science or knowledge put into practical use to solve problems or invent useful tools.

Technology Tools: Refers to software, primarily, that can be used to develop or support online course content. This could include blogs, wikis, authoring tools such as Articulate or Captivate, and Web 2.0 tools available through the Internet.

Video Presentation Device: Tools that are used to assist in conveying information during a presentation. Some examples include flip charts, slide projectors, overhead projectors, and laser pointers.

The remainder of this paper will deliberate the advantages and disadvantages of technology in the classroom and how it impacts the performance of students.

CHAPTER II: TECHNOLOGY IN THE CLASSROOM AND STUDENT PERFORMANCE: POSITIVES AND NEGATIVES

There are many positive as well as negative implications for how and why we use technology in the classroom. Some negative issues that arise from using technology in the classroom include cyberslacking, distraction, unequal access, cheating, cyberbullying and the physical and health concerns technology brings into the classroom. Engagement, instant information participation, differentiated instruction, and preparing students for the future are some of the positives that technology brings. As we all know, laptops can be a necessity for writing papers, accessing course material, conducting research, taking notes, and other school related work, but what about the downside to these devices in the classroom? Many students are using technology in classrooms to check social media, watch YouTube, purchase an item from Amazon, or surf the Internet for something more entertaining. Are these the only downsides to technology in schools?

Negative Consequences of using Technology in the Classroom

Cyberslacking

Many students today are using the Internet and technology during scheduled class time for non-class related purposes, commonly known as cyberslacking. This type of distraction redirects students' attention away from what's really important and has many educators distressed. Teachers play a big part in this as well. If teachers and professors want productive and engaged students, they need to make sure they are keeping their students' attention, including by differentiating activities for every student and tailoring their lecture style to individual interests. However, they are not entertainers and cannot meet all needs all the

time. When students begin to drift off in class and are not in the present moment, they intermittently use multiple methods to bypass the situation. This may arise from a need to control stress or remain calm and stay positive by placing their attention on something else, such as their cell phone, iPad, or Chromebook (Taneja, Fiore & Fisher, 2015). When students are showing a lack of attention, this is called 'cyber slacking' in the classroom (Taneja, Fiore & Fisher, 2015).

In today's world, it has become increasingly difficult to detach students from technology. When you take a walk through the school hallways, from elementary school to college, it's all the same. Students are staring down at their cell phones as they walk to their class or handing their EarPods to friends because they want them to like their new favorite song. Lecture halls are filled with glowing screens for many students to place their attention on instead of their instructor. Why would a student want to listen to an instructor articulate about the principles of polynomial and rational equations, functions and logarithmic numbers when he or she can look over their neighbors' shoulders and watch them beat a video game on their laptops? Is it possible that all this technology in the classroom is more of a distraction? There are a few researchers (Taneja,Fiore, & Fischer, 2015) who have focused on this issue. Students are influenced by other students through consumerism, avoiding their reality by absorbing their minds in entertainment, simply daydreaming in class, lack of attention, cyber slacking induced anxiety along with distraction from others who are cyberslacking (Taneja, Fiore & Fischer, 2015). These researchers wanted to dig deeper and discover why students begin cyberslacking. They categorized the reasons that they found in their research into three categories: the subjective norm, the descriptive norm, and consumerism.

The first reason, the subjective norm, is students' perception of social pressure to use the Internet and other technologies during scheduled class time for non-class related purposes. Students want to be accepted by their peers, so how do they do that? One way is by observing their environment to get an understanding of the students around them, finding acceptable behavior so that they can conform to their social group and fit in (Taneja, Fiore & Fischer, 2015).

The second reason, descriptive norm, is believing that students' peers are cyber slacking or paying attention to their devices rather than the classwork. It's been proven that students who see their classmates engage in a certain behavior become precisely associated with their own behavior (Taneja, Fiore & Fischer, 2015). If a student sees multiple friends and classmates playing games instead of doing research on their Chromebooks, the student will consider it normal and acceptable. Therefore, "The descriptive norm reflecting cyber slacking in the classroom is positively related to the intention to cyber slack in the classroom" (Taneja, Fiore & Fischer, 2015, p. 142).

The third reason for cyberslacking is student consumerism. Each year, family members take their high schoolers to visit campuses all over the world. Students often have in their minds a list of items that they want to experience during their college years. As a result, students and family members are willing to spend a great deal of money at the school of their choice. In doing so, students feel they are entitled to use technology in the classroom for any reason since they are paying money to attend. They feel that, since it's their money, it's their right. The results indicated that descriptive norms influence students' intentions to cyber slack in the classroom (Taneja, Fiore & Fischer, 2015).

The majority of students today have their own cell phones. So many in fact that, 53 percent of fourth and fifth graders, 66 percent of middle schoolers, and 82 percent of high school students all regularly use their cellphones during the school day (Versel, 2018) and many teachers allow them to use their devices for learning purposes during class. How can teachers be sure that they are using their cellphones for school related topics without standing over their shoulders? Aaron and Lipton (2018) discovered that 92% of students have used their smartphones to text during class time which is an alarming number of students. When students spend considerable time on their devices, that does not correlate with class instruction, teachers and professors fear that this is negatively influencing the student's ability to learn and absorb the information that is being presented to them (Aaron & Lipton, 2018).

Is there a happy medium to using technology in the classroom? Should teachers ban all types of technology during class? Should technology be prohibited except when instructors say otherwise, or should there be no ban on technology during class? Aaron and Lipton set out to find these answers. They did a study on 351 community college students from 20 classes. Half of the instructors had policies in place that prohibited technology in the class and the other half of instructors were very lenient on technology and did not have a policy in place during class time. They asked the instructors to show a twelve-minute video about Pablo Picasso and at the end of the video, a short, eight question quiz was given. Aaron and Lipton discovered a pattern. Students with poorer performance (zero to three correct responses) were more likely to have used their devices during the video (Aaron & Lipton, 2018)." The students who scored better on the quiz (scored 4 or higher) were the students who did not have access to their

devices during class. Overall, students from classes with more restrictive policies tended to score higher than those from classes with less restrictive policies (Aaron & Lipton, 2018).

Lack of Access

Many students do not have access to Wi-Fi or are not able to afford dependable devices due to living environments and socioeconomic status (Brown, 2019). While there are ways around this problem, it cannot be easily solved. Some school districts are able to supply their schools with technology for each student, along with educational grants to help with the cost of technology. There are also many schools across America that are not able to supply schools with one-to-one devices. Some schools are not even capable of supporting a computer lab or able to give teachers their own personal device. As a consequence, these students do not have the same experience as those who are using technology in the classroom and are not able to build their technology skills or access courses offered online (Pandolfo, 2012).

Technology is the future. Almost all jobs rely on technology, and if students do not have access to Internet/Wi-fi they will only trail further behind. They will not be able to get the instant information, differentiation or the engagement that other students are getting. This may cause students to miss out on seventy percent of jobs which rely on technology due to lack of computer knowledge and end up in that ten percent of low-paying jobs that do not require technical expertise (Pandolfo, 2012).

In March 2020, schools all over the county needed to find a way to continue teaching with the Covid-19 pandemic going on. Educational districts across America responded by shutting down their schools and began distance learning completely online. What did that mean for those who did not have access to modern-day internet connections? Were they

unable to continue school due to something that is out of their control? Socioeconomic status affects students' abilities to access learning content remotely.

Some solutions included using a temporary solution of having "drop-off" and "pick-up" locations, where teachers made available weekly learning packets which included homework, tests, books and/or technology for each student who did not have access to the Internet. During the Covid-19 outbreak, teachers also had to strictly rely on technology. While attendance is still mandatory, those students without access would have to use telephone access. This may not be feasible to many students. Many schools have tried hard to reach every student by setting up a homework helpline, which is through the internet. How will these students be able to get to that helpline without the Internet? What about the parents who work all day and are unable to drive their child to a pickup location? Distance learning is great for students who have access to the internet and are old enough to drive, but those who do not have the technology capability, or access to pick-up locations have a greater chance of failing school.

Cheating

Academic dishonesty is nothing new. Since the beginning of homework assignments and tests, there have been cheaters. What is new however, is the way students are cheating, which includes storing notes on a cell phone, using voice recorders, texting others answers and using a smartphone camera to take a picture of a test or exam. These examples were non-existent ten years ago. Technology is progressing so rapidly that school districts cannot keep up with the cheating policies. With technology, it's very easy to copy-and-paste the work of others and use it as one's own - without giving credit where it's due. Campbell (2006) completed a

study regarding the challenges of mobile phones in college classrooms. 176 participants (59% female and 41% male) at a university in the western part of the United States were given a 5-point Likert scale survey with responses ranging from strongly disagree to strongly agree. The responses ranged from "I like when a classmates phone goes off during class," to "I hate when teachers have the option to use phones during class." The dependent variables consisted of the following: ringing, complaint, cheating, and cell phone policies. His findings found that many students reported "negative attitudes" about mobile phones in college classrooms and supported policies restricting phone usage in the classroom to prevent cheating and mobile phones ringing during class time. Campbell did notice that age played a big role in the 176 responses. Younger students (10-15 years) did not have a problem with phones ringing in the classroom compared to older students (17 and above) along with the fact that younger students wanted to be able to use technology devices anytime during class, even if it distracted others. Teachers are finding that younger students are taking advantage of the situation and texting their friends the correct answers. There are many different ways students are cheating during school hours.

Today teachers are facing cheating facilitated by technology as they struggle to find constructive uses of technology to develop learning strategies (Marcoux, 2010). Marcoux is aware of the many different ways students use technology to cheat during school. As time passes and the world advances in every way possible, so do students' ways of cheating. Before technology took over, students would write answers on their hands, place textbooks on their feet, pass notes around, and look over their shoulder to pass their test. Today, students are getting much more creative with the help of technology. Texting, emailing, and even Facetime

calls are becoming more and more evident in classrooms. Marcoux (2010) is concerned that teachers are not focusing on this issue and that students are able to notice when teachers are ignoring this behavior and can use it to their advantage to cheat in class. Marcoux found and recommended some practices for teachers to manage cheating in the classroom such as:

- Making sure students are showing their work and describing how they came up with the answers.
- Ensuring that students are equipped to adequately use and evaluate the information given to them.
- Teaching students how to effectively use technology.
- Allowing for differentiation in assignments that are given during class.
- Assuring that every student has access to the tools they need to effectively complete assignments and are easily available for students to fit into their schedules.
- Being collaborative with colleagues, students and their family members.
- Assuring that teachers are fully educated in the subject.
- Continuing to learn new strategies for students.
- Becoming a good role model for students.

Students can see how you treat others and see that if their teacher treats someone without respect, then they can do that too (Marcoux, 2010).

Cyberbullying

With all the new technology available in schools, problems are lurking in the background. Since the addition of technology devices in schools, many have seen an alarming surge in cyberbullying. Cyberbullying is the electronic posting of mean-spirited messages about

a person (such as a student) often done anonymously (Merriam-Webster.com). Between 2011 and 2012, 28,085 children made contact with child helplines to report cases of cyberbullying (Robinson, 2013). The Anti-Bullying Alliance states that "43 percent of teachers said their school did not currently teach anything about cyberbullying and online safety; more than 30 percent said they did not have adequate knowledge to match the online behaviors of their pupils, with 44 percent saying they did not know how to respond to cyber-bullying" (Stopbullying.gov Ed Board, 2019, p1).

If technology is being allowed in schools, it should be mandatory for students to learn how to properly use technology; teach them the right and wrong ways; and teach the consequences of posting online such as how future employers can see everything they post. Many teachers claim that getting rid of technology all-together, would greatly help alleviate cyberbullying (Klein & Martin, 2013)). But in doing so, it might cause even more problems than it would solve. Many schools have already taken the step to ban cellphone use during school. With students being able to record and take pictures of their classmates without their consent and upload them for the world to see, Riley (2017) believes that that type of school environment is an unacceptable learning environment. "There's plenty of evidence that cellphones are detrimental to academic achievement, particularly for students who are less advantaged to begin with" (Riley, 2017, para.14). School can be a tough place for children. Specifically, cellphones have made what is an already difficult environment abundantly worse (Riley, 2017, para.14).

There are many different forms of cyberbullying such as hacking into a person's email account and sending inappropriate images or messages, posting the mobile number of

someone else online, sending photos (actual or edited) that could cause harm and embarrassment, creating 'hate groups', and spreading rumors online (Damani, 2011). These are just a few examples of ways people are being cyberbullied. They can cause harmful long-term impacts on not only academics, but development, self-esteem, academic achievement and mental health and confidence. Myers and Cowie (2019), conducted research regarding cyberbullying and the issues it causes and concluded that cyberbullying can affect the self-esteem of those who are bullied and often leads to social withdrawal, and long-term negative consequences on the victim's mental health and academic career. They found that college students who were victims of cyberbullying were more likely than non-bullied peers to suffer from depression, anxiety and a range of psychosomatic complaints on top of academic difficulties (Myers & Cowie, 2019). "Victims also reported that the cyberbullying had an adverse effect on their capacity to study and on their ability to form social relationships online and in the real world" (Myers & Cowie, 2019, p75). Cyberbullying can be long-lasting, and young adults and children will perceive cyberbullying as normal and acceptable.

Rivara and Menestrel (2016) conducted a study consisting of 186 university students who admitted they had bullied a classmate from their elementary schooling to high school. They concluded that "This research indicates long-term benefits so that the behavior becomes entrenched and continues to be a successful strategy for improving the bully's social status (Rivara & Menestrel, 2016, p1029).

Physical and Mental Health Concerns

Technology has brought great benefits to populations all over the world, reducing communication strains and increasing worker productivity. However, this has also had some

negative effects on the physical body (Chagar, 2018). Some of the main health concerns with technology are eyesight and laziness. Staring at screens all day can cause significant eye strain (Chagar, 2018). Chagar (2018) states, 60.5 percent of Americans who use digital devices for more than two hours a day have reported eye strain. While there are a few eyewear solutions such as taking breaks from your devices, anti-reflective glasses and blue light-filtering capabilities, the most effective way is to stop using technology devices completely. As many know, that is much easier said than done. Brown, a high school teacher, believes that some of these problems from technology can be solved by limiting the number of hours students spend in front of screens. (Brown, 2019).

Brown also described a study done by Khouja et al., (2019). The purpose of the study was to see if screen time was associated with anxiety and/or depression in young people. A total of 14,665 persons participated in the study. Anxiety and depression were measured from the ages of 16-18 using a self-administered, computerized version of the received clinical interview schedule (CIS-R) that was to be completed during a study clinic (Khouja, et al., 2019) 2019). Screen time was assessed in a study questionnaire. Respondents were asked six questions relating to time watching television, computer use, and texting categorized as less than one hour, one to two hours, and three or more hours per average day. Separate responses were collected for weekend and weekday use (Khouja, et al., 2019). Anxiety and depression were categorized as: no anxiety/depression, symptoms but no diagnosis; and diagnosis. Anxiety and depression were categorized as: no anxiety/depression, symptoms but no diagnosis; and diagnosis.

- Anxiety Categories: Symptoms related to general anxiety, phobias, panic and worry.
- Depression categories: Symptoms related to depression or depressive thoughts.

During this study, they found that 11 percent met the criteria for a diagnosis of anxiety and eight percent met the criteria for a diagnosis of depression. Screen time was slightly higher on weekends than on weekdays. The results indicate that there is about a 10% association between technology use and anxiety/depression. Overall, this study showed that, for the majority of students with depression and anxiety, the symptoms were most evident during the weekends, when students were not in school.

Macale (2019) wrote the following statement regarding technology and how it contributes laziness among not only students, but everyone.

> "From the comfort of my own apartment, while watching the fight on Pay Per View, I can pause-mid match to double check that my favorite songs on iTunes have been downloaded or my playlists on Spotify synced to my smartphone. I switch inputs on my television to my PS3 which has a Blu-Ray DVD of Avatar in order to watch one of my favorite clips. I then slip on my Xbox 360 headset to slip inputs again and finish up the party chatting with my friends list, as they've been waiting for me to play a session of Call of Duty with them. After a quick round, I flip back to Pay Per View, resume the fight, and tweet out what's happening on screen like a sports announcer, amusing myself with the flood of replies" (Macale, 2019, p1)

Research has found that a majority of teachers believe technology influences student's health adversely and a considerable amount of time spent in front of screens tends to lead to mental

health problems such as depression and anxiety. If a person depends on their cell phone and is continually checking for new text messages or comments and likes on social media, the phone can become a substitute for real-life interaction. "This is one of the worst ways that technology affects students, they spend so much of their time substituting real-life experiences for virtual ones" (Healthcare Business Today Team, 2020). This over-abundant use of technology is becoming increasingly common among students. Instead of having students work together on a project in class, they are allowed to make their projects on Chromebooks or iPads, which dramatically decreases social interaction in classrooms. How does this impact the learning of children in schools? Do they need to be using devices all day long, just to come home and continue using technology?

Purcell, associate director for the Pew Research Center (in Richter, 2012) conducted a study with 2,462 teachers. The teachers were asked to complete a survey to see if they think students are too plugged into life. From that survey, "60 percent of teachers said that technology had a negative effect on a student's ability to communicate face-to-face and interact socially. 71 percent said they thought technology was hurting a student's attention span" (Richtel, 2012, p1). Many of the students felt surprised when out with friends and everyone is on their phones instead of talking to each other. Technology is becoming a replacement for social interaction and teachers have taken notice. Another researcher, who sides strongly with Purcell, noted that countries with less technology in schools end up having stronger educational outcomes (Kesling, 2015).

While it has been proven that technology causes eyestrain, less human interaction and other negative effects, Norris (2016) doesn't believe technology is necessarily negative for

physical and mental health, but that video games can be used to help students become more active. The purpose of her study was to determine the quality of school active video game (AVG) use on physical activity and health outcomes, based on a review of 9,020 articles, 22 studies and 18 different interventions. To be included, studies needed to have included AVGs as an intervention exposure in school within a lesson, during break-time, or before or after the school day (Norris, 2016). Students who were eighteen years of age or older were not a part of the study.

Overall the majority of the test results were what Norris anticipated. There are video games being created that are meant to get students up and moving. Wii Fit is a game that gets kids off the couch and moving around (Norris, 2016). In order to fix child obesity, gaming companies are coming out with more AVG (Active video games) that involve active, physical movement.

Through face to face interactions, instructors can help students build self-esteem, confidence and emotional maturity. That is something that cannot be taught through an email or text. While some can argue that face-to-face interactions can be taught through online platforms such as Zoom or Facetime, students are not getting that physical face to face interaction that is needed for developing social and mental health. While there are many solutions to the physical and mental health concerns that technology can help with, many researchers still feel that technology plays a negative role in a student's life. Technology is not meant to ensure a robust learning culture; it is simply a directional tool that is only as beneficial as the instructor who utilizes it.

Positive Impact of Using Technology in the Classroom

Cyberslacking, distraction, unequal access, cheating, cyberbullying and the physical and health concerns as mentioned above are important reasons technology needs to be monitored and taught in schools. Some feel that technology should even be taken out of schools completely because of these side effects of technology. But are there positive reasons for using technology that can outweigh the negatives? Many believe that engagement, instant information, participation, differentiated instruction and the future of technology have a larger impact in the classroom than the negative effects.

Engagement

"Engagement refers to the degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education" (Marks, 2000). Now, is it really possible to have students be engaged in classrooms with all the different types of technology surrounding them? Many researchers believe technology can not only engage students, but also greatly improve student participation. Phi Delta Kappan (1992) found that students were able to adapt and quickly understand how to use technology in their classes and were much more engaged when using technology versus not using technology. The purpose of the study was to see if teachers and programs which focused on one subject and applied technology software to learning curriculum would be more engaging than mere drill-and-practice programs. The study was implemented over a period of five years in a Florida school. Classroom environment, long-term continuous progress, role of teacher, student

empowerment, curriculum materials, classroom management techniques and materials, and parent involvement were all taken into account in choosing the schools that participated.

Teachers were asked to begin their class with a short lesson/project and then spend most of the period circulating and guiding students with the "Project Child" approach. This approach included computers being used by students and teachers for the majority of learning. Textbooks, hands-on activities, computers, and a variety of other technologies were also available and used every day during the study. Phi Delta Kappan (1992) concluded that the earlier students started to use technology in classrooms, the better they would understand technology in the future.

Phi Delta Kappan (1992) concluded that students' attitudes and levels of involvement were higher and achievement test scores were up as well. Phi Delta Kappan (1992) strongly believes that adding technology can greatly help students collaborate and be more engaged in the classroom and that technology gave students an opportunity to be in control and to master content that they formerly thought impossible (Phi Delta Kappan, 1992). Even though this study is from 1992, it proves just how effective use of technology can be and affirms how much stronger technology has developed and grown in the last 30 years.

But what about students who do not speak the language being spoken in their classroom? Are they still engaged when it comes to learning not only the language, but the technology that comes with it? Mango (2015) wanted to further Phi Delta Kappan's research with students who couldn't speak the language being spoken around them and use technology to find out if non-English speaking language students could be just as engaged in the classroom.

In Mango's study, students who had a hard time understanding English used iPads for different classroom activities that combined visual and oral projects. These activities were aimed at offering hands-on practice that combined speaking, listening, reading and writing skills as well as promoting collaboration and creativity. The apps that were used included the following: Educreations, Doodle Buddy, Aviery, StoryKit, ShowMe, Screen Chomp, and Comic Life. Students could also consult internet resources for their assignments if they chose to (Mango, 2015). Mango found that students were much more engaged with the iPads. He even noticed higher grades for non-English speaking students when using the iPads in his classroom compared to not having them.

Can video games play a role in the classroom? And if so, what types of video games? When people hear the word video game, many instantly think of racing games or games that are inappropriate for classrooms. Simpson and Clem (2008) have very similar stories. Simpson, an eighth-grade teacher, was tired of her students not wanting to participate or pay attention in any of her classes and decided to try something modern and unfamiliar with her students. The school district that she worked at decided to try a new curriculum that was built around a commercially available video game focused on the restaurant industry. She began by finding out what students already knew about the restaurant industry and what they wanted to know. Students were given a list of questions such as: what makes a restaurant successful, what academic skills are necessary to work in a restaurant…etc.

The game *Restaurant Empire* was used in this study. Students worked in teams of three and were given unique roles that they were responsible for. Students were required to design, set up and successfully run their own restaurant. Every possible aspect of running a restaurant

was taken into consideration, from hiring staff and deciding on restaurant decor to deciding on menu items and food ingredients, all within a predetermined budget (Simpson & Clem, 2008).

In order to decide if students were actually learning, independent and objective assessments were in place to grasp, absorb, and consolidate the content areas required for both the class and the game. Simpson concluded that student engagement and participation greatly improved with the technology in her classroom, which demonstrates that the use of video simulation games has hidden potential in the classroom. Video games have proven to motivate individuals by virtue of being fun (Simpson & Clem, 2008). What's more, its use is supported by constructivist theory, which calls for active engagement and experiential learning (Simpson & Clem, 2008).

Lacasa (2013) also brought in video games to help student engagement in his classroom. SimCity is a world-wide video game, set in an innovative learning environment designed around the concept of participatory culture. The students in this study were in their third year of high school, composed of boys and girls in a language compensatory program. Lacasa found out through his study that students were able to engage in the assignments better through the use of video games. "This research shows that commercial video games, originally designed for entertainment, can become educational tools used in the classroom when approached from a double perspective" (Lacasa, 2013, p. 2).

How did Simpson and Clem measure engagement in their classroom? Simpson and Clem (2008) incorporated their project into two phases and six sessions. Phase 1: Preparing the workshop. Researcher and teacher interact in an interview prior to the beginning of the

workshop. Phase 2: Talking, Playing, Thinking. The teacher creates groups of students and gives a brief tutorial for students.

- Session 1: Students get familiar with games and controls.
- Session 2: Students play the role of mayors/business owner and/or architects of the cities. The teacher favors a collective reflection process.
- Session 3: Continuous interactions between the real and the virtual world.
- Session 4: Students think of the game as a tool to create by becoming aware of what they've learned.
- Session 5: Students gather necessary resources to make videos using a movie maker.
- Session 6: Audiovisual productions are shown to class. The research team examines the use of multi-media discourses and the relationship between real and virtual.

Throughout all of the studies and research done regarding engagement with technology, one thing can be clear. Technology dramatically helps student engagement throughout classrooms across the country. Students can learn what needs to be taught and enjoy it along the way.

Instant Information

"Just google-it," is a phrase many kids are familiar with today. You don't know something, just google it! You get instant answers within seconds. Maybe it's something more complicated and you need to visually see the steps. Luckily for you, there are thousands of how-to videos for almost anything on the internet. From planting your own garden, to cutting

your own bangs, all the way to how to paint a flower with step by step instructions. "The gift of the internet to the classroom gives teachers the chance to give their students a holistic view of any given subject while still giving students the guidance to find the right sources" (Centre, 2018). Distance learning is generating new learning opportunities as students engage in online, digital environments and as school districts improve upon educational practices through the use of hybrid courses, personalized instruction, new collaboration models and a wide array of innovative, engaging learning strategies (Himmelsbach, 2019).

Technology allows students and others to receive instant feedback through multiple platforms. Online games and quizzes help gain students' attention, including the students who normally would not participate or speak out in class. When students take quizzes online and submit them, they can find out how they did instantly. Online quizzes also have an enormous benefit for teachers. Along with instantly graded quizzes/tests, teachers can view the analytics and see certain questions and areas where students may need more work or reteaching. Even making the quizzes anonymous and having students take them at the beginning of each class can inform and direct the instructor on what areas need more focus. At the end of class, giving the same quiz again allows the teacher to get a better understanding of where each student is at. "Some instructors are turning toward classroom 'gamification,' the use of competitive scenarios, and the distribution of points and rewards to make the classroom more fun and engaging" (Himmelsbach, 2019, p.14). Types of gamification can include role playing, blended learning, and digital storytelling.

Technology can also help teachers with tedious tasks. For example, keeping track of student's attendance, projects, tests, and classroom management. Taking attendance through

the use of technology can send information to the office instantly, saving teachers time each day. Jill Watson, a professor at Georgia Tech, created an artificially intelligent teaching assistant. This “robot” was able to answer a selection of students' questions and have the ability to pass any questions that the “robot” couldn’t handle to a real person. Technology integration in schools can reduce the amount of time spent on minor tasks (Himmelsbach, 2019).

Participation and Interaction

Several studies have looked at the impact of technology in the classroom on student participation in class activities and found that use of technology can impact participation positively as well as negatively. For example, in a music class with 40 students, a teacher, struggling to get their students to complete their work in a group setting, found the iPad useful for students to engage more with each other. Apps like SheetRack (a comprehensive music sheet reading app designed for the iPad) were favored in this classroom. Students no longer needed to be in a quiet computer lab which made this case study more enjoyable for students from day one (Miller, 2012). The class members met every two weeks to discuss instructional activities, research, and other experiences using their iPads. One respondent stated, iPads allow one to easily access information. Groups produced work more quickly and eased group cohesiveness along with the fact that it was convenient and fun. The students admitted that the iPads were more interesting and wanted to continue using them in the future. In another classroom across the country, the same results were found when iPads were given to the students. The students became intrigued as they had never used iPads in their school

before. The students' engagement significantly increased. Students couldn't wait to begin class, causing higher engagement, participation and learning.

512 undergraduate and graduate students were recruited via an email to request their participation in a study regarding student's participation and familiarity with computer technology, along with obtaining information about their opinions on computer technology in a science classroom (Perry, Cunningham & Gamage, 2012). 139 students accepted (100 graduates, 29 undergraduates) who were enrolled in the communication sciences and disorders program at Illinois State University.

The procedure began when the students were provided instructions for completing the study using an online learning system. After obtaining consent, students were asked biographical questions (age, race, sex) and questions about their comfort and familiarity with computer-based programs. Students were then told to watch a 3D animation and answer four questions that pertained to their animation and its potential application and use in the communication sciences and disorders classroom. The results were very positive. The students reported an average comfort level of 3.8 out of 5 and 86 percent preferred that professors incorporate computers more frequently in the curriculum. The researchers, (Perry, et al. 2012) all concluded that student's 3D computer animations helped them get a better understanding of the material, contributed significantly more information than that of printed text and defined topics more smoothly (Perry, et al. 2012).

iPads can go beyond getting students more engaged. For example, if students are not good at handwriting, they can use a computer to type. If students are unable to draw, they can use a digital canvas to help guide them to create their projects. Giving students different

options such as designing free games, online quizzes, activities and diagrams, and creating online surveys, can let students choose what they are more interested in doing, causing their participation to skyrocket in comparison to non-technology classrooms where lecture style teaching is happening. The goal of the professor is to refocus these appendages into tools that keep the students participating in the curriculum by using the tools differently (Dassa & Vaughn, 2018).

As these researchers above have shown that technology helps students participate in classrooms, Mckinney and Sen (2016) wanted to further this research and find out if technology was hurting or helping students in a group setting, since many jobs are based around group work. If a student can't work in a group setting or doesn't understand how, Mckinney and Sen wanted to know if technology might be able to help those students who are struggling or can't work in a group setting or don't understand how. With all the social and communication technologies like google docs, Facebook, Zoom and Google Classroom, students can use these social platforms to provide a rich communication environment that facilitates collaborative learning (Mckinney & Sen, 2016). Working on a project with a group of students can be challenging, especially at the college level. Students challenged by classes at different times, full-time jobs, and weather are some of the major reasons that make it difficult for students to get together in person to work on a group project. A theme the researchers saw throughout the study was that technology had a great impact on helping students find a time to get together, whether that be in person, or Skype. "We used E-mail and Skype to sort out logistical issues such as arranging meetings, and also updating work progress and file sharing. This method of communication has been really effective for our group, as Skype's instant messaging

service facilitated the sharing of information despite not being physically together" (Mckinney & Sen, 2016, p.381). Many individuals feel that conversing in person is more efficient but is impractical. When group members are able to find a time to get their work done and decide who is doing what, each member becomes responsible for a part of the project. This causes students to participate more effectively since they are assigned to certain parts of the project. Overall, Mckinney (2016) believes that integrating technology into group work greatly contributes to students participating further.

Many teachers were still skeptical about iPads and if they actually help with participation in group settings. The research so far has proven that iPads do help individual's participation, but can iPads help group work and participation? Ward, et al. (2013) were up for the challenge to find out. They asked students in grades 9-12, (50 percent female, and 50 percent male) to participate in their research. The students were given a warm-up exercise, following a brief 5-10-minute lesson on basic food-chain construction. The class was then split up into different groups. Each group was given one iPad. On each iPad, the application Food Chain-The Game was downloaded. In this game, the player controls a crab in an effort to avoid predators and consume prey. Students were asked to use the Food Chain-The Game app to collect data for additional calculations and considerations. Lastly, students reconstructed the food chain of the game based on their observations of the different trophic levels (Ward, Finley, Keil & Clay, 2013). Afterwards, students filled out a questionnaire about the use of the iPad and what they learned.

In Ward, et al's study (2013) student scores were compared with students' improvement in understanding to determine which types of students showed the greatest

improvements. Overall, the majority of students learned more about the food chain and remembered it, after interacting with the game, compared to the warm-up exercise. “The feedback from students was highly positive regarding the tablet-based lesson, with most asking when the next iPad lesson would be” (Ward, et al., 2013, p.379). Student participation was high, especially among those students who typically struggle to participate in regular classroom activities. The Researchers found technology to greatly benefit participation and engagement in classrooms, whether it's iPads, Chromebooks, or desktop computers.

Differentiation

Developing lesson plans to benefit all the distinct types of learners and how all learners take in information that is tailored to each student's learning needs is very important. Every student learns differently, whether that's visual, auditory, reading/writing and/or kinesthetic, Delay (2010) conducted multiple studies using technology as a differentiated instruction tool. She found that technology can help vary the approach taken to instruct, guide and assess (Delay, 2010), which in turn, helps the likelihood of reaching every student.

Delay found twelve different technology avenues that can help differentiate for various types of learners. One example is Glogster (*edu.glogster.com*) which is a free, online poster design website in a multimedia format. Students can add graphic illustrations along with audio clips. Dynamic features like this pique the interest of students in ways that creating a traditional paper poster cannot. The second website that Delay (2010) found is called Animoto, (*animoto.com*). Let's say you have an animation class and a particular student is unable to use their hands to draw original animations on paper. You can show the student this website and he/she is able to use a powerful communication medium. Animoto will convert photographs,

text and video clips into a stylized, engaging cinematic feature set to music with unique transitions (Delay, 2010). This is a great tool for students struggling with special needs or someone who is physically unable to use traditional mediums such as pencil on paper.

Still another technology tool is called VoiceThread (*ed.voicethred.com*). This particular website incorporates the four different learner styles: visual, auditory, reading-writing, and kinesthetic. With students able to upload images, videos or film themselves with a webcam, visual learners are more engaged and willing to learn. Auditory learners are able to comment on their peer's projects by uploading their responses via phone, microphone, or webcam. Other students in the class can post responses and constructive criticism to their peers' threads to encourage communication and engagement (Delay, 2010). The students who learn best by reading and/or writing are able to type their answers onto the website or upload articles that they've read. Kinesthetic learners, who like to learn through touch, can build a particular project with their hands and then take a picture of their final work and upload it to VoiceThread. When a teacher is differentiating a lesson, getting to know the students and their interests is a key factor to differentiating lesson plans. Teaching in such a way as to address students' various readiness, interest and learning styles makes the classroom experience more enjoyable for students and teachers alike (Delay, 2010).

A study by Brown and Warschauer (2006) employed qualitative and quantitative methodologies to investigate effective approaches to technology integration in teacher-preparation curriculum, incorporating credential-based coursework and field placements. The study emphasized collaborative efforts among colleges of education and K-12 districts, implementation of technological innovations within the context of school reform, and the role

of technology in cultivating students' higher order learning faculties (Brown & Warschauer, 2006). The participants were one-hundred and ten scholars that were enrolled in an informational technology course.

The procedure involved observations that were pre-arranged with each participant and took place when technology was going to be used during the observations. Classes were observed for approximately two 50-minute periods of instruction per each focus participant for a total of twelve hours of observation overall (Brown & Warschauer, 2006). During these observations, the researcher made sure to concentrate on how well the students remembered the technology information. The results found that providing the proper amount and types of differentiation for each individual student caused not only higher participation, engagement, and feedback, but higher grades and understanding for students who were struggling (Brown & Warschauer, 2006). Other results included implementing and teaching students how to use technology and integrating a technology project.

There are a few steps that can begin immediately, including integrating more technology into the teacher's professional preparation courses and better understanding of students' needs and interests. While It's difficult to research technology use in the classroom when there's little to no access to it, technology is starting to get easier to bring into the classroom making it less challenging for teachers in the next couple of years. While students need differentiated instruction with technology, people seem to forget that teachers need differentiated instruction with technology as well. If teachers are better prepared and learning about new technology tools and software, it can only benefit the students.

Today's educational system demonstrates the importance of adapting new, innovative ways for schools to enhance the future. Technology inspires students to connect and collaborate more, work on group projects and contribute their strengths no matter the time or location. Many careers require collaboration as mandatory and necessary. Having students learn the importance of collaboration, during K-12 education, prepares them for their future careers. Employers also want their future employees to have great critical thinking skills and to be able to work in a group setting. Connected classrooms have the ability to introduce modern tools and resources, which allow students to cultivate their critical thinking skills and learn how to properly work as a group.

Students are responsible for Chromebooks, iPads, laptops, digital cameras, and/or anything else their district has and must agree to a set of rules when using technology equipment. This agreement gives students ownership and responsibility including for equipment that is lost or damaged. This level of responsibility is something that will be carried into their future. Technology in the classroom also helps students learn to adapt. Technology changes quickly. Most students become familiar with new technologies before they are brought into the classroom. These digital natives are more apt to easily understand new technology in the future. Even students with restricted access at home have the opportunity to engage with technology and increase their computer literacy skills by using technologies available in their classrooms (Smith, 2020).

Conclusion

In the spring of 2020, a new virus called Covid-19 erupted, causing a pandemic throughout the world. Non-essential businesses around the globe were asked to be shut-down

to help the spread of covid-19. Schools were shut down immediately and teachers were asked to continue teaching 100 percent online. Over 1.2 billion children were out of the classroom. From language apps, virtual tutoring, video conferencing tools, or online learning software, there has been a significant surge in technology usage since the outbreak (Fleming,2020). The covid-19 pandemic has changed education forever. Since schoolwork must be completed online, this is forcing students and parents to learn new technology. While some believe that the unplanned and rapid move to online learning (with no training, insufficient bandwidth and little preparation) will result in a user experience that is detrimental for continued growth, others believe that a new hybrid model of education will develop, with significant benefits (Lalani & Li, 2020). These researchers found out that students absorb 25-60 percent more information when learning online compared to 8-10 percent in a classroom (Lalani & Li, 2020). With students learning all this technology at a younger age, it can prepare them for their futures. Some schools have found out that distance learning (due to Covid-19) has worked better for them compared to in-class learning and have decided to change over to all online for the future. A professor at the University of Jordan states, "It has changed the way of teaching. It enables me to reach out to my students more efficiently and effectively through chat groups, video meetings, voting and also document sharing, especially during this pandemic. I believe traditional offline learning and e-learning can go hand by hand" (Lalani & Li, 2020, p302). Online learning technology has made a tremendous significance in education and we all need to delve into its hidden potential.

With the help of technology, students now have the ability to type and submit assignments instantaneously online, attend classes through virtual zoom meetings in their living

rooms and continue to prepare themselves for their future. The current educational situation has also enhanced differentiation and increased student-teacher interaction.

It is, however, important to note the limitations of technology. There are copious amounts of students who do not have access to the Internet or electronic devices, causing the less fortunate students' unequal education, and with that comes an abundant amount of health concerns.

Technology on its own is not good nor evil. The choices that we make with these devices are what can help or harm others. By teaching the younger generation how to use technology properly, they can surpass the current generation to create bigger and better things.

CHAPTER III: DISCUSSION AND CONCLUSION

The purpose of this paper has been to go in depth about how the use of technology in the classroom impacts the performance of students. There are many findings about how technology can help impact the performance of student engagement, instant information/feedback, more participation, differentiated instruction and how technology can help prepare students for the future. There have also been many findings, however, that prove technology does not positively impact the performance of students, but in fact deters students who use technology in the classroom by creating distractions, cheating, cyberbullying, unequal access, and physical and mental health concerns.

Many believe that there can be solutions to the negative impacts that technology has on students in the classroom. As there are many distractions that technology brings into the classroom there are ways around it. Brown (2019) states: "By setting clear expectations and consequences, teachers can help encourage students to focus on their work."(p. 709) For the teachers struggling with students cheating in classrooms, districts can also set up internet blocks to help keep students from visiting other sites when they are supposed to be working. Brown also believes tools like Turnitin can help combat plagiarism. Teachers can require students to submit their papers and Turnitin will determine how much of the paper is similar to current or past submissions. It will also mark any anomalies it discovers for the instructor's review. For districts that have unequal access, educational grants can also help offset the costs of technology.

For all the disadvantages technology brings, it is something that every school district depended on during the Covid-19 pandemic. Schools were given two weeks to come up with a plan to teach k-12 grade classes strictly online. Schools across America were able to find ways to support student learning via technology and solutions to the complications that technology contributes to students' performance. "Evidence suggests that educational technologies can improve student achievement, so long as such tools are integrated thoughtfully into teaching and learning" (Host, 2019, p208). Technology has forever changed the world we live in. We are online, in one way or another, all day long. Our phones and computers have become reflections of our personalities, our interests, and our identities" (Host, 2019, p229).

Professional Application

After reading research from multiple perspectives, this author strongly believes that colleges need to know that the pros of using technology in the classroom greatly outweigh the cons. "Everything that you do and everything that we do in the media and everything that we're doing now in medicine is based increasingly on sophisticated technological advances that will enable us to do things more effectively, more efficiently, and in the end, better for kids and teachers. If this is not better for kids and teachers, we shouldn't do it" (Klein & Martin, 2013, para.4). With all the research that has been done regarding technology in classrooms, this research can be applied to education in not only the United States, but globally as well. The Coronavirus outbreak has proven that to us. Technology benefits all grades, from kindergarten all the way up to graduate school. No amount of research has been able to disprove this. "Digital devices, software, and learning platforms offer a once-unimaginable array of options for tailoring education to each individual student's academic strengths and weaknesses,

interests and motivations, personal preferences, and optimal pace of learning" (Herold, 2016, para.9). Technology is something that is here to stay. Instead of taking all our energy and trying to disprove that technology impacts students in a bad way, why don't we embrace it and make it better?

Limitations

This study has two main potential limitations. The first is sample size. Studies that were conducted with two-hundred and fifty people or less were not considered. A smaller sample size led to more inaccurate and unrepresentative results. The second limitation concerns the year the studies were concluded. Research conducted before the year 1995 was not used due to outdated technology. We have come a long way with the development of technological devices, and they are changing rapidly with each passing day. Technology used in school districts twenty-five years ago no longer exists, and that data is now not relevant.

One other limitation with this study is self-reported data due to the fact that self-reported data is limited and cannot be independently verified. When researching, I expected to find more opinions and data regarding students' personality types, learning styles, and rule obedience, as well as the student's perspective regarding their view on teaching styles. When researching the downside of technology in classrooms I was unable to find studies done that were based on students' opinions. The studies used for this paper were based on research primarily from the teachers' point of view. In the future, it would be interesting to see more of the students' perspectives on technology. Do students just say that it's not a distraction, so it doesn't get taken away from them? Or do they truly feel that technology is a helpful tool for them? Prospective exploration could incorporate elements that can further demonstrate

students' thinking towards cyber-slacking and making sure to acknowledge students' personality types and learning styles.

Implications

I believe that research still needs to be done regarding the school systems and how they can make sure each student has access to technology by researching the benefits and costs of one-to-one technology in the classroom. The biggest downfall with technology use that I have found, is in regard to certain school districts that are unable to get the funds they need in order for each student to receive their own device (such as a Chromebook or iPad). According to Kajeet, "Ask any educator about their number one problem and you will most likely hear the answer: budget. According to Cosn's 2019 K-12 IT Leadership survey report, budget constraints remain the top challenge for IT leaders - and has remained the number one challenge for the past six years. The number two challenge? Professional development, which is directly tied to the budget problem" (Kajeet, 2019, p. 13).

More research needs to be done regarding funding programs such as Classwish, the only nonprofit that lets people contribute to fund any k-12 school or teacher in the country. There are many other grants that can help schools who are unable to provide technology devices to all their students. For example, the Collaboration Grants, Ewing Marion Kauffman Foundation, Computers for Learning, allows schools which are eligible to receive donations through the Computers for Learning program if it is public, private, or parochial, serving pre-kindergarten through grade 12 students. The Pitsco Education Grant is awarded in the form of a gift certificate that may be used to purchase hands-on STEM products. Mccarthy Dressman Education Foundation (Academic Enrichment Grant) funds proposals that provide

opportunities for students who don't normally have the option to use technology. Innovative Educator Prize was designed to fund programs that support and exemplify how the use of technology is a catalyst for innovation in the classroom. While some of these options may still not be feasible for all school districts, it can be a good start. There are still other questions, however, such as:

- What about the students who have no internet connection at home?
- What about the ones who have no access to computers outside of school or the public library, or students who are new to the county?
- Can a grant be the answer to all those questions?

Conclusion

This study investigated how the use of technology in the classroom impacts the performance of students. We have explored many examples of both positive and negative impacts on the use of technology in the classroom and how technology impacts the performance of students. In conclusion, technology is a versatile and valuable instrument for teaching and learning. Teachers not only need to be prepared to use these technologies effectively, but also be able to teach students how to use it effectively. So, what does all this mean? It means that, "the world is changing, and education must change with it. Technology in the classroom, technology as a means of communicating with parents, and for use in streamlining day-to-day tasks are imperative to success for both educators and students" (Murphy, 2019, p.98).

"Teachers are using technology to replace old models of standardized, rote learning and creating more personalized, self-directed experiences for their students. There's more multi-

device synchronization with software that supports multi-user collaboration and more support for virtual conversations, both within and beyond a classroom" (Murphy, 2020, p.24). Technology can open up many doors not only for students but teachers, family members, friends, neighbors, and employers. Technology is the future, let's embrace it.

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