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Technology in the Classroom

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Abstract

Technology in the classroom is supposed to touch on four different aspects of learning, all of which are important for the success of the student. Those components are active engagement, participation, frequent feedback and a connection to the content and to a real world experience (Wallace, Georgina, 2014). These four things can be done through technology. Technology today is far more advanced than it was 30 years ago, especially for kids with special needs. 30 years ago, technology was limited to programs on computers for kids (Woodward, Rieth, 1997), but today there are things like virtual reality simulators so kids can go anywhere they desire from their classroom (Raskind, Smedley, Higgins, 2005) This paper will cover some of the older technologies used in the classroom, as well as the newer ones and how they impact the children who use them.

Introduction

In 1983, the ratio of students to computers in a school was 168:1 (Carver, 2016). Nowadays in a lot of schools the ratio of students to computers is 1:1. With that being said, technology in our society is a relatively new thing, let alone technology in our classroom. It was only about 85 years ago the first computer came out and even sooner that pieces of technology like phones and Ipads were invented. In a classroom where technology is important in running a successful lesson, it is important to know the different technologies that are out there. Technology is supposed to touch on four different aspects of learning: active engagement, participation, frequent feedback and a connection to the content and to a real world experience (Wallace, Georgina, 2014). The focus of my research paper is how intervention specialists can implement technology in the classroom and how it is beneficial to students with all different types of needs while also touching on some of these points.

Advantages and Disadvantages

The advantages of having technology in the classroom are endless. Whether it is a computer, an Ipad or just a simple talking device, the technology benefits the kids a great deal and it can even be beneficial to the teachers as well. According to the University of Texas, "technology does more than accommodate students; it can level the playing field" (The Use of Technology in Special Education, 2017). Technology in the classroom also helps students to increase independence, it can personalise learning, it allows for a better connection to peers, it reduces learning anxiety, makes it easier for students to communicate and it can improve academic skills (The Use of Technology in Special Education, 2017). For kids with special needs, it also allows them to participate in a classroom setting, complete independent work, collaborate with peers and much more (Martin, 2006). Having technology in the classroom can help kids achieve things that they wouldn't be able to achieve on their own. Working and observing in classrooms, I have seen first hand how technology has benefited kids. I have seen how iPads, a relatively new technology, allows children who are nonverbal to communicate with their teacher and their peers. Technology not only benefits the kids who need it to do everyday tasks, it also benefits the kids around them. Having technology in the classroom engages most students and it can even increase their motivation to get things done. Technologies such as education apps or interactive videos keep students attention longer (Riasati, Allahyar, Tan, 2012). Plus if they are having fun, they are learning and they will be more likely to want to try something like that again.

There are some disadvantages to having technology in the classroom though. One concern is the lack of access that schools have to the newer technologies. Some districts even worry about having technology at all in their schools. Even if the district can afford any type of technology, the cost to have internet in the building can get expensive (Riasati, Allahyar, Tan, 2012) . While doing things the old fashioned way is not terrible, districts aren't giving kids with special needs the best education they can if they can't communicate with others. Another drawback is teacher training. Not all teachers are trained in these newer technologies that are coming out. It is proven that teachers can not use the technology, things such as computers, to effectively teach their students because they do not know how to use it themselves (Riasati, Allahyar, Tan, 2012). How can teachers help students if they don't know how to work something themselves? This is a big issue in some schools but some schools have been able to overcome the differences and the schools who haven't are working on getting the best education for their kids.

The Cost of Technology

Like previously mentioned, some schools do not have the resources or funding to get new technology for their schools or even just a class. Something to consider when talking about technology is how much it costs the district and how much teacher training they can provide on new technology. Some schools can afford new technology every other year, but some schools can't afford new technology even every 5 years. So how do we give everyone an even playing field. I interviewed two superintendents, one from a smaller school in Atwater, Ohio; the other one from a slightly larger school in Doylestown Ohio. Dr. Shawn Braman, the superintendent at Waterloo Local Schools, gave me an insight on what their technology budget is most years. He said that they spend approximately $15,000 on technology a year and that included professional development for the teachers if they want it. The reason they might not want it is because he said that like most smaller schools, they get stuff that was already used, but still like brand new so they might already know how to use it(Braman, 2019). According to Niche.com, approximately 1,065 students go to Waterloo and even though they are a less wealthy school, they can still get good technology for their kids, even at a lower cost. He mentioned that they are working on 1:1 computers right now in their district.

Mr. Osborn is the superintendent at Chippewa Local Schools in Doylestown. In his email to me, he said that his district spends $228,000 on technology a year and that does not include professional development for the teachers. He said that they spend it on five things, "License costs (Microsoft word etc..), programming, bandwidth and network we purchase, hardware and computer we buy and phone system" (Osborn, 2019). That statement right there tells you how much just wifi can cost to be accessible throughout the school. In the email, he mentioned that their professional development is not included in this budget, but it might be included somewhere else. According to Niche.com, approximately 1,284 students go to Chippewa, K-12.

Comparing these two schools and their budgets proved useful because it helped to put into perspective how much money school districts put into the technology portion of school. For bigger, more wealthier schools, their budget is bigger and therefore they can afford the newer technologies. However, some schools, like Chippewa or Waterloo have to budget but also can make due with what they have. While technology is a rather new idea, schools have been advancing to bring the best for their students and that includes students who have special needs.

Technology in special education can be classified into two categories, low tech and high tech. Low tech consists of things that help kids succeed but to not require modern technology. An example would be a pencil grip, highlighting tools and visual schedules. High tech consists of things that use a higher level of technology to help kids succeed. Some examples are computers, text to speech devices and augmentative and alternative communication devices.

Communication Boards

Communication boards are mainly for students who are non verbal, or can not communicate using sound. Communication boards come in all different shapes and sizes and at all different levels as well. One type of communication board is a basic board with pictures that kids can change in and out based on their needs. These boards are effective if the child knows what all the pictures mean or can read what they are but can't speak the words themselves. This types of communication boards would be considered low tech and while these boards work for some, they do limit communication between individuals and don't leave a lot of room for conversations (Carballo, Doval, Jeremias, 2010). The next step up from this kind of communication board is an electronic communication board. This board consists of pictures and when someone pushes on the pictures it will speak for them. This board does not differ a lot from the most basic communication board, but it is slightly improved from the most basic communication board. These electronic boards, however, do limit the vocabulary the student can use and it limits the use of sentences for students (Carballo, Doval, Jeremias, 2010). A higher tech, more commonly used communication device is an iPad. There are apps, such as TouchChat or Avaz, that teachers or parents can get for their students that allow them to communicate with others. These apps allow students to make sentences and the device will say the sentence or word out loud for the student as well.

There was a study done on the communication abilities in students between an iPad and a picture based system. There were five elementary school students who were a part of the extended school year who participated in this trial. They used the picture based system where the students had to pull a card off of a velcro strip or pick a card out of a series of cards in front of them and hand it to the teacher. The other option was an iPad where they had to pick a picture that was attached to a snack item along with the phrase "I want" and "more" (Flores, Franklin, Hil, Hinton, Musgrove, Renner, Strozier, 2012). They did this trail over a period of 15 days, every three days switching back and forth, starting and ending with the picture based system. To have a subject of what the kids were talking about the used snack time to elicit a response from the kids about what snack they wanted. This study showed that there was not a preferred system for the students. When this study was done, iPads were not yet as up to date as they are now. In the study, it also states that the students did not have any experience with using the iPad for communication (Flores et al., 2012). I found this interesting because nowadays there are all different kinds of uses for iPads in special education classrooms.

A more recent study was done in 2018, showing how iPads can be used as communication devices among students with autism. The study was done with the understanding that children with autism can not always communicate what they need or want and that leads to unwanted behaviors in the classroom. This study took two students, a 5 year old boy and a 6 year old girl, who both could not say more than 20 words. When they said a word the teachers could not understand them and this led to an unwanted behavior such as head banging, crying and protesting (Correa, Haughney, Muharib, Wood, 2018). These researches wanted to know if functional communication training with an iPad would help them. They sat on the floor with the student and gave them a toy. After 30 seconds they would take the toy away, showing that it was their turn, and if the child did not respond within 10 seconds they would give it back. Eventually the child showed unwanted behavior. They did the same thing with the iPad, except the children were expected to use the iPad to communicate what they wanted. This study showed that with the help of the iPad, the problem behavior in each of the children became fewer and fewer (Correa et al., 2018). The iPad helped the children to communicate what they wanted instead of them having to bang their head against something or start to cry. To me, this shows that using an iPad as a communication device really benefits children who have the mental capacity to communicate with others, but can not verbally do it.

Through my time in the field and volunteering, I have seen many different ways for kids to communicate what they want or need, from the basic picture board that has four options on it, to an iPad where the options are endless. I have seen kids use something as simple as a switch device to press buttons on an iPad to using an eye tracker so the device could track their eyes and speak for them. With that being said we are starting to see more and more iPads being used for communication devices for children and the old picture based boards being set aside for the time being.

Applications

In the past 10 years, applications for tablets or iPads have come a long way to enhance a students learning. From a snake game on a Nokia to thousands upon thousands of apps on your smartphone, apps have made an impact on the world. While a lot of apps are for our entertainment, a lot of apps can be used in the classroom as well. These apps help students practice, learn and retain information that they are expected to learn. Apps can not only improve the learning of kids in general education classrooms, they can also improve the learning of kids who have special needs.

There is an abundance of apps that you can download for your students to use in a special education setting. Anything that the students might be struggling with, there is probably an app for that. For example, if a student is struggling with anger management problems, you can have them try Mood Journal. Mood Journal is an app where students can log what they are feeling and why they are feeling that way and then the app keeps track of all the different moods they have (Canzonetta, 2019). This is a great way to have the students think about what is going on and why they are so angry. It also is a great visual for the student's, parents and teachers to identify a pattern for their behavior. There are apps for learning social skills, time management, stress management and so much more. While these examples are social emotional apps, there are also apps for kids to learn math and science, reading, history and so on.

Apps can be an essential part to learning in the classroom. One study was done using math apps in the classroom to help improve math scores. It was stated in this article that "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning" (Asam, Gallegos, Trussell, Zhang, 2015). If it can help students learn math, simple apps like that can be applied to any subject. The researchers gave some examples as to why using math apps in the classroom can benefit the students. They said that it allows kids to work on things at their own pace. This is helpful to students because not every student excels in every subject (Asam, et al., 2015). If students can work on things at their own pace, they will be more likely to participate in the activity and they will learn the material. Another benefit to apps in the classroom is that most of the apps give kids immediate feedback. They do not have to wait a day or two to understand what they did wrong or know that they understand the material, they can have it all right at their fingertips. This study was conducted in a fourth grade classroom where they used four apps to supplement regular instruction. The kids used these apps every day for a month. At the end they were given an assessment with things they learned from the apps on it. Data showed that all the kids' scores went up between the pre and post assessments and by using the apps as a way of learning, it closed the gap between average students and struggling students (Asam, et al., 2015). This is important because closing the gap between students who are struggling and students who are achieving typically is what teachers and school districts strive for.

There was another study done in 2012 that compared learning with apps and learning the traditional, non electronic way. They took one first grade class and one second grade class and gave one class iPads when working on reading/ language arts lessons and the other classroom had no iPads during this time. During these three months, they would switch which class had the iPads and which one did not. The results showed that they kids were definitely more engaged in the lessons when using an iPad compared to when they were not using an iPad. They concluded that iPads and apps do play a significant role in the classroom when it comes to learning. The article states that even after this trial period, both of the teachers continued to use the iPads because “they saw students become more engaged and ‘blossom’ into deeper thinkers at a young age” (McKenna, 2012).

While being in schools, I have seen so many uses that classrooms have for iPads and apps throughout the school day. I have seen students use apps/ iPads to take breaks when they are feeling overwhelmed or frustrated, I have also seen them use apps/iPads in addition to instruction. In my own classroom during student teaching, if a student was refusing to work on their math with me, I would hand them an iPad and tell them to play a math game (math bingo, flashcards etc.). Even though they were not doing math with a teacher, they were doing some sort of math that gave the student practice, which was the ultimate goal. iPads are an added benefit to schools because they not only allow students to learn, they also expand their knowledge. From the countless number of books students can find online, to practicing math facts, to regulating their emotions or stress, to communicating through text to speech apps there is something for everyone. Whether you are in a general education setting or in a special education setting, apps on iPads or smart devices are helpful to anyone in the classroom, you just have to find the correct tools.

Virtual Reality

Despite what people might think, virtual reality has been around since the 1950's (How did virtual reality begin, 2017). While we might not think of virtual reality as something that old, things like the first airplane simulator or the Sensorama (interactive theaters) have been around for a while and are considered the first virtual reality technology (How did virtual reality begin, 2017) . We have come a long way since then. In education however, this concept is a relatively new thing to teachers and students.

There are two main different types of virtual reality. One is full immersion virtual reality. This type of virtual reality is where most, if not all, of your senses are being stimulated during the experience. Laura Freina and Michela Ott describe it as feeling like the world you entered is "authentic and real and the players feel as if he or she is actually there" (2015). The Sensorama would be an example of full immersion virtual reality. To understand the sensorama completely, they gave the example of how it used to give people the experience of riding a motorcycle. It would not only include a 3D experience, it also incorporated smells, sounds and feelings that you would experience while riding a motorcycle (Freina, Ott, 2015). The other, more common type of virtual reality is a Head Mounted Display. The Head Mounted Display (HMD) is a piece of technology that goes around your head and covers your eyes. There are a lot of different models out there. Some you can attach your phone do and some you sync your phone to to show a picture. These types of virtual reality simulators typically capitalize on a person's sight and hearing. Some of them can also track movement of the person's body (Freina, Ott, 2015). In a literature review, these two virtual realities were placed in a survey to see what virtual reality system got used more and in which settings it would get used more often.

In this survey, Freina and Ott looked at a lot of articles out there on virtual reality to see where virtual reality was being used the most and what kinds of people were using it. It turned out that a lot of schools use it for their kids with autism and other kids who have high functioning disabilities to help them learn new jobs. The article states that "An augmented reality system uses a HMD to train developmentally disabled people to serve food in a restaurant" (Freina, Ott, 2015). This is beneficial to any high school class because all the kids in an inclusive classroom at the high school level will need to learn how to work a job and be able to keep that job. If the kids are able to learn in the classroom, employers might be more apt to hire them knowing that they have had some sort of training. In addition to helping high school students train for a job, virtual reality can be found in adult vocational training programs and in a high school and college setting (Freina, Ott, 2015).

Adult vocational programs use virtual reality to train people how to do a job, just like it could be used in a high school. They use virtual reality to provide an immersive experience to a dangerous job or for a job where people need to practice before they can successfully do a job, like a surgeon (Freina, Ott, 2015). This is beneficial because for someone who has never experienced parts of their job, they can now do so before people's lives are on the line or before they have to get it 100% correct. While this kind of simulation can be used in a high school setting, virtual reality can also be used for things like classroom management, interactive science labs and field trips to places nobody ever thought possible.

One way that schools can implement virtual reality throughout their school is through an exercise program. A study was done on students who have intellectual and developmental disabilities (IDD) and how much they are exercising. The article starts off by explaining what IDD is and that students who have a disability don't often exercise as much as they should. This can then lead to becoming obese and other health concerns that go along with that (Barrio, Firestone, McMohon, McMohon, Tutt, 2019). They mention a variety of reasons as to why kids with IDD do not participate in physical activity, but it is mainly because of lack of access to physical activity . They either don't have the appropriate sports for them, inaccessible fitness areas or recreational centers and most gyms or fitness places don't have the experienced staff to help kids with disabilities exercise. This then leads to kids not being active. This study proposed using a virtual reality simulator to immerse students with an IDD to be more physically fit.

They started with four subjects, ages 14-21 and all diagnosed with some sort of disability. They then introduced a stationary bike and the virtual reality simulator to the kids. They ran some baseline data to see how long they can ride the bike before they get tired and how many calories they burn while riding the bike. Then they did the tests. Each time they student exercised they were riding a bike, but the virtual reality simulator was programmed to show them something else. One time it was a race car race, one time it was kayaking, things that made them think they were not riding a bike at all. They performed this simulation enough times to be able to gather accurate data. They found that by having the kids ride the bike every day until they could not anymore, the stamina of the kids was increasing. By the end of the study, the kids had doubled if not tripled their times on the bike (Barrio et al., 2019). This was to be expected because the more you practice something the better you become at doing it. This study was not done to show that the kids could be physically active if they had the correct equipment, it was to show that virtual reality can help students with IDD to become more active in a school setting which would lead them to have healthier lives.

Virtual reality can be used at the college level as well. For example, instead of showing pictures on a projector, a foregin language class can use HMD's to go to China and see the places that they are learning about or France to take a look at the louvre. Another way virtual reality can be used in a college setting is to help preservice teachers learn how to be in a classroom. One article suggests that universities can use virtual reality to immerse preservice teachers into a classroom without leaving campus. The article reports that a lot of special education teachers have felt very under prepared to step into their first classroom and even a couple years after that (Taylor, Deshpande, Markelz, McKinnon, Scheeler, 2019). While teaching programs offer plenty of field hours and student teaching opportunities, still, some teachers do not feel prepared enough. This article suggests a virtual reality where preservice teachers can teach kids, implement their own classroom management system, their own ways of instruction and a place where they can boost their confidence in the classroom (Taylor et al., 2019). They do mention this would be an enhancement instead of a replacement for classes such as student teaching or any other field placements, but this could be a possibility in our future education classrooms.

Personally, I have not seen virtual reality in the classroom setting yet. To have virtual reality as an option in any classroom, let alone a special education classroom, would be an amazing opportunity that I hope to see someday. Virtual reality can take kids anywhere, from inside a human body to places like China or France. On the flip side you have virtual reality simulators to teach students and adults how to do a specific job. 50 years ago, you learned as you went, but now kids who have disabilities and who don't can be fully prepared to go into a job, confident that they know what they are doing. Virtual reality is a game changer to students and teachers alike.

Conclusion

As you can tell, technology in the classroom has come a long way since the beginning, and this is just the tip of the iceberg. There are countless other technologies that are used in a classroom daily to help students grow, learn and be successful. Communication boards are important to everyday life because they can help children and adults to communicate with the world. There are many different types of communication boards available to suit the needs of any individual. This type of technology touches on the three of the four big things technology in the classroom should touch on, active engagement with their peers, participation with others and by using communication boards, they can connect to the content by asking questions. Using applications in the classroom is beneficial to the students because this can enhance their learning and understanding of different topics. Apps are beneficial to any students, not just students with special needs and that is what makes it such a great tool to have in all schools. Apps touch on all four of the things technology in the classroom should touch on. By using apps kids are actively engaged they get frequent feedback, they have the chance to participate and most of the time the apps connect to their content. Virtual reality is something that is relatively new to the school system, but already you can tell it will have such a huge impact on the schools, the students and the teachers. Virtual reality can not only help kids go on extravagant field trips that they otherwise might not be able to go on, but it also allows students to become active and makes them want to participate in the activity more. Virtual reality touches on three of the four areas: active engagement, participation and connection to the content. Even though technology can be a scary thing in our world and in our classrooms, it can also be a helpful tool that allows students to succeed not only in the classroom but in life as well.

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