Chapter 17
Education in the Computer Age: Information Technology and Its Effects on Student Learning in a Classroom Setting

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Abstract   After both negative and positive experiences with computers in my own schooling, I decided to investigate attitudes among students and teachers towards the use of technology in the classroom. Most students agreed that technology helped them with their work, but at the same time, more than half also tended to agree that they get distracted by using technology during the class. From observation, I found that most students remained engaged in both a technology and a non-technology-based lesson, aside from two students who showed signs of disengagement in both. From looking at assessment results, I found that academically elite students achieved well in both technology and non-technology-based assessments, but that students in a class of varying ability tended to do better with the technology-based assessment, which suggested that technological devices can be an effective equaliser for students. All teachers except one felt that using technology is either essential or at least a useful tool when used effectively in conjunction with other teaching methods.

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> One thing that I learned from today's lesson was using the appropriate strategies in making sure students are on task when using technology during class. In order for students to use technology effectively, it is essential that the teacher be able to monitor the students and the devices they are using. For instance, students used computers today in order to work on their memoirs. Some of the students had their computers facing in the other direction from where I was sitting. Funnily enough, every time I would walk over to that group of students they would quickly change from what they were looking at to the document that they were supposed to be working on. However, the documents that they were supposed to be working on were always blank. So I made the decision to sit at the back of the class, that way I had a clear view of their computer screens. By doing this, students got back on task and made a more productive effort.

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Introduction

Three years on and four placements later, I am still fighting the same battle. Finding a way to maximise the use of technology without it being a major distraction in the classroom has been a common theme throughout my placements and is something that I am still working on.

From my inception as a preschool student in the late nineties up until today's times, the technology used in classrooms has changed on a dramatic scale. Not only has there been a dramatic change in equipment, but also the efficiency of these new technologies. For instance, overhead projectors, an outdated and heavy machine that is limited to showing one slide at a time, have now been replaced by interactive whiteboards (smart boards), which are multifaceted and quicker to run.

During my time as a pre-service teacher and classroom tutor, I have noticed the ever-increasing reliance on technology in schools; in particular, the effects it has had on both the teaching and the learning processes in a classroom. There is no doubt that there are both positives and negatives when it comes to technology in an educational setting; however, the question is whether the negatives outweigh the positives. If so, then the role of technology in schools must be re-evaluated. With technology being a central part of our lives, there is no running away from this dilemma, but rather teachers and administrators alike must embrace this issue and find ways to overcome it.

In this study, I will investigate whether the use of technology in classrooms has a negative or positive effect on student learning. Specifically, I will examine the use of mainstream and instructional technology and their effects on student engagement and academic achievement.

Who Was I?

My love–hate relationship with technology can be pinpointed to my time as a primary school student. I still vividly remember in year 3 when they introduced desktop computers in the school. At that time, desktop computers were about the size of mini-fridges and were very expensive. They even had a special room for these computers, which could only be accessed by booking in advance. Then, the principal made it compulsory for every class to undertake at least one session a week on the computers.

Every fourth lesson on a Thursday, our classroom teacher, Ms. D, would walk us over to the computer laboratory where we would be handed over to Mr. N, the specialist IT teacher, for our weekly lesson. Our hourly lesson would mostly consist of touch-typing activities and familiarising ourselves with programmes such as Microsoft Word and PowerPoint. Most of my classmates loved going to the computer laboratory and even thrived in these lessons, whereas for me, well I absolutely hated it. I did not adapt well to the new skill sets presented to me and thus would lag behind the others.

My incompetency could somewhat be due to my unfamiliarity with computers. Growing up in a low socio-economic household, owning a computer was not a viable option for obvious reasons. In fact, our household did not own a desktop until I was eleven years old. To make things even worse, Mr. N was a no-nonsense sort of guy who did not tolerate incompetency. Thus, I was at the end of some serious scoldings from him.

The negative experiences of my primary school years made me mistrustful of technology. However, my outlook on technology changed when I reached middle school. Increasing numbers of computers in Australian schools during the 2000s also saw a spike in students' computer skills (Howard and Mozejko 2015). I, for one, was a beneficiary of this experience. As I became more familiar and better with these devices, so did my fondness for them increase. The computer soon became my choice of device and still is up until this day.

Who Am I Now?

I investigated this topic among students and teachers to gauge their attitudes towards technology use in the classroom. Most of the students agreed that they feel technology helps them with their work. However, at the same time, more than half of the students I talked with either agreed or somewhat agreed that they get distracted using technology during the class.

Of this much, I am sure that although technological devices are an effective tool to get students to work and be engaged with the lesson, they also can hinder students from doing their work as they can cause a distraction. I observed students' engagement over the course of two lessons in 35-min intervals. One lesson was technology-based, and the other was non-technology-based. Overall, the majority of the students exhibited engaging behaviour in both the technology- and the non-technology-based lessons. There were two students who showed signs of disengagement. However, the environment did not make a difference in their behaviour, as the two students were consistently disengaged in both lessons. In this case, the environment or the devices being used in the lesson were not to blame, but rather that appropriate strategies need to be put in place in order to achieve complete engagement from all students.

I then looked into students' assessment results comparing classes by using technologies or not using technologies. In an academically elite class, students are highly motivated to learn and take pride in achieving good results. Therefore, this group of students achieved well in both technology- and non-technology-based assessments. Differently, most of the students in the class of varying abilities received a higher grade for the technology-based assessment compared to the non-technology-based assessment. Thus, it can be concluded that the use of technological devices in this classroom can be an effective equaliser for students and can help students to achieve better academic results.

The teachers I have been talking to were teaching in English, Humanities, Mathematics, Special Education and Language faculties. All of the participants incorporate

some sorts of technological devices in their classrooms, whether it is smart boards for documentaries, laptops for research and assignments, or smartphones and iPads for classroom activities. Interestingly, some teachers felt that technology is very essential to their teaching and are currently heavily reliant on technological devices for their lessons. Other teachers were of the opinion that technology is a useful tool when used effectively in conjunction with other teaching methods. Only one teacher felt that technology plays little importance in connection with her teaching methods.

Of This Much I Am Sure

During my time as a tutor and pre-service teacher, I have seen both the negatives and the positives of incorporating technology into the classroom. One major positive of technology is its potential to increase student independence, engagement and communication. Technology is an effective resource to use to achieve these potential benefits as it provides immediate access to information and allows for increased hands-on learning (Houston et al. 2017).

Often, enhanced student engagement will positively correlate to an increase in academic achievement. Not only can technology be an effective tool to motivate students to do their work, but it also acts as an equaliser for students who struggle to achieve academically. In particular, it has been proven that using technological devices can assist students with learning disabilities in their ability to learn and achieve (Obiakor et al. 2010).

However, technological devices are only conducive to learning if the instruction has been carefully designed to make optimal use of the technology (Houston et al. 2017). The way teachers use technology can be determined by how technologically competent they are (Wenglinsky 1998). I find this point most relevant to older teachers who are more often than not less technologically savvy than younger teachers. Even though older teachers do not necessarily know how to use devices such as laptops, iPads and smart boards, they still incorporate these devices into their lessons as they believe it will help students to do their work. At the same time, there is a constant temptation for students to use technological devices for activities that are non-school-related. There are always those students who will use their time on technological devices to play games or check their social media when presented with the chance. Despite the negatives, I would find it very difficult without the use of technology to conduct my lessons. Whether it be displaying notes on the smart board or using laptops for students to complete their assignments, much of what I do in the classroom, incorporates some form of technology.

Conclusion

The paper was to investigate whether the use of technology in classrooms has a negative or a positive effect on student learning, specifically the use of mainstream and instructional technology and their effects on student engagement and academic achievement. After a series of investigations, I found that technological devices can be a distraction to students but at the same time can also help students to do their work. From a teacher's perspective, technological devices can only be useful when they are used as a tool in conjunction with other teaching methods. Although technology-based lessons can somewhat be of more benefit in increasing student engagement, the evidence is not sufficient enough for this statement to be conclusive. After a review of students' grades, it was concluded that technology could be an effective equaliser for students with learning difficulties. However, the use of technology does not make much of a difference with students who are considered highly academic.

To conclude, technology and technological devices such as laptops, smart boards and iPads have become intertwined in today's classrooms. The future will continue to be shaped by technology, so not using it will more than definitely set up students to fail. It is simply a matter of finding the appropriate strategies for using these devices that best shape both teaching and learning practices.

References

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