

Title

Understand how Digital Technology impacts on the teaching and learning needs of schools, teachers and students in the 21st century.

Author

Jack Anderson Principal Whangaroa College

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Executive Summary

Technology is not a new concept in schools. The old school chalk and blackboard were the tools of yester year now replaced by digital devices such as smart boards, interactive screens and intuitive software. What is more recent is the ability to digitise teaching and learning tools through innovative technologies and powerful portable connected devices.

With the increase in Digital Technologies around the world students' parents and educators are becoming digital consumers and are increasingly demanding more access to a fountain of knowledge via the internet through a plethora of smart devices. We see digital technology everywhere from the gas pump, checkout, ATM's, in our back pockets as cell phones right through to the programmable fridge to keep our groceries fresh. So why would we not expect to see digital technology in our schools.

A common technology seen in many schools is the desktop computer introduced in the late 1970s early 1980s. Desktops have come a long way and have seen many technological advances with the transition to portable devices such as laptops and iPads being amongst the more significant. The now common smart phone was also born out of this technologically innovative time line. Students now walk around with the world at their fingertips.

Today, digital technology allows teachers opportunities to engage with students inside their own classroom as well as students on the other side of the world. Furthermore, when a child attends a school without expert teachers in a subject area they have an opportunity to engage in distance learning via the World Wide Web more commonly known as the web or the internet. The internet provides access to vast learning resources beyond the imaginations of our parents through a network of hyperlinked online content via educational reference sites that are growing by more than 20% each year. Teachers are no longer viewed as the fount of all knowledge as students can access the same resources and information if they so desired.

Digital information is available through text, photographs, videos, interviews, interactive activities, current events, and online blogs/vlogs just to name a few. People also communicate directly with their audience through social media platforms such as Facebook, Twitter, and Instagram etc. Today, digital consumers have a lot of power in their hands' as they are

relatively free to explore the wide-open domains of the internet. However, there is also a lot of information on the internet that is harmful, false and misleading therefore consumers need to be vigilant when accessing information online. More importantly, if unmonitored in a school setting it can lead to students accessing information they should not. Therefore, policies and procedures should be in place to ensure students are making the most of their educational opportunities while keeping safe online. Throughout my sabbatical blended learning environments came across as a good balance where traditional pedagogy merged with digital technology showed encouraging progress in providing a sustainable learning environment.

Keeping up with the latest technology is a challenge for schools. Acquiring the latest devices comes at a cost in terms of money and a cost to teachers' who need professional development to teach with the new devices. Furthermore, the Board of Trustees must ensure policies and procedures fit for purpose are in place to support the ongoing needs of this technology and its purpose in the curriculum space. Although devices can keep off task students engaged, they cannot replace a great teacher. Therefore, Boards of Trustees need to consider the best use of money and decide whether they invest in technology or quality teachers.

Professional Learning Activity

The learning activities associated with this sabbatical is to understand how Digital Technology impacts on the teaching and learning needs of schools, teachers and students' in the 21st Century. To achieve this, I read a range of relevant text, visited two schools, surveyed principals', students and teachers from those schools, and attended an International Conference on Learning.

Instruments

I have used qualitative surveys by asking questions requiring actual answers opposed to gathering quantitative data through the collection of numbers and percentages alone. It is important to understand the story behind the responses. By asking minimal questions, I have attempted to gather deeper and more meaningful responses. I have ensured all survey respondents their identities and the identities of their schools will remain anonymous.

Activities

Principal visits

I visited and met with two secondary school principals from lower socio economic areas. Both schools have maintenance and management of their Digital network outsourced to external agencies. The common factor was having an external agency taking care of the infrastructure allowed key personnel in both schools to continue to support the school in addressing student learning and assessment. Previously the Maths teacher managed the network in one school while the husband of one of the senior leaders managed the network in the other school. Neither school has a BYOD scheme claiming that this has the potential to disadvantage some students who cannot afford the Technology. Both schools provide Digital devices to students such as Chrome Books and Tablets for use in the classroom. Students were not able to take these devices home

Both Principals' claimed having a reputable organisation was more appealing opposed to stand alone internal technicians. In the past both Principals' had internal IT support but as these support services left, the schools' had a system that was only familiar to the previous technician. This saw additional cost to employ new technicians that came with new systems, processes and a different outlook on the provision of IT in schools.

Both principals' acknowledged the cost to the service providers was comparable to an onsite local technician however one of the benefits was being able to access quality advice and support regardless if the school appointed technician was available or not. Furthermore, future proofing solutions proposed by providers meant Principals were able to approach the Board of Trustees with an informed perspective to ensure their school kept pace with the ongoing changes in the IT space. Both schools use cloud-based servers mentioning a benefit to staff was the ease of access to learning and school resources remotely.

Unfortunately, neither school was able to provide any longitudinal data that reached beyond 5 years. Looking back at student achievement data over the past five years showed a marginal gain in student achievement then followed by a plateau. Both principals mentioned teacher interest when digital devices first entered the teaching space was high. However, anxiety and resentment slowly began to take over. Some teachers were not as computer literate as students therefore placing some teachers on the back foot.

Teachers

Many schools introduced digital technology through computers in labs and some would argue these labs replaced the typing rooms of old; as a result, many typing teachers took on the role of providing instruction for this newly introduced technology. Over time, computers began to make their way around the schools into a range of curriculum areas until computers became a tool in every learning area from Mathematics through to Physical Education. Mathematics teachers took a deeper interest followed by Science then the wider teaching body of the school. It is rare to walk into a school today and not find a raft of digital technology on hand. Furthermore, technology has breached the confines of the classroom and now found in all areas of the school, and beyond the school gates on field trips.

I received responses from 11 out of 18 teachers invited to participate in my informal research project. All respondents overwhelmingly claimed digital technology in the classroom was a beneficial tool to help engage and maintain student interest. Teachers noted that students in the senior classes (YR 11-13) tended to explore in-depth functionality of electronic devices opposed to junior students (YR 7-9) who generally used the same devices for gathering, editing and presenting data and projects.

Although digital technology has benefits for teachers such as the ability to call on information in an instance, manage student records and to access real time achievement data they also faced challenges. Many of the teachers surveyed had the same responses around the digital technology challenges in particular the pace of changing technologies. With constant changes in technology comes the need for teachers to keep pace and this comes with a financial and personal cost. Schools faced an increase in spending for new technology and Professional Development while some teachers found it challenging to keep pace with change. One respondent mentioned they were in their twilight years and did not see the need to put in time to keep pace with all the changes. Likewise, some teachers mentioned many of their students' digital technology skills surpass their own which sometimes left them feeling as though they are on the back foot in some situations. Furthermore, respondents suggested more work is required on developing a pedagogy that is fit for purpose and transferable in this ever-evolving digital platform.

To this end, despite the ubiquitous learning opportunities presented by modern digital technology most of the teachers surveyed claimed there is no obvious improvement in student achievement in their classrooms. They state that although the students appeared engaged they sometimes were engaged in activities outside of the set learning activities. Furthermore, comments such as electronic devices have become surrogate teachers as relieving teachers could see themselves placed into computer labs or allocated a COW (Computers on Wheels) for the lesson. An interesting point made by one of the respondents is that society expects

24/7 online access and students feel despondent when they are unable to get on line which increases their anxiety.

Students

Ten of the 18 students invited responded to the survey questions. As the survey was sent at the beginning of the second term holidays this may have had an impact on the number of returned surveys. In hindsight, it would have been better to conduct small focus groups with students. The following are a compilation of responses from students.

Benefits

Students mentioned the word processing features as a major benefit in the classroom. This includes the ability to write copious amounts of text then edit and re-edit without too much fuss.

Additional benefits identified by students:

- Ability to learn alongside students on the other side of the planet in real time.
- The spell check and the grammar checker functionality.
- Software for creative arts, mathematics, science
- Access to the internet
- Storage
- Remote access
- Video conferencing for subjects where teachers were not available in the school

When asked what technologies are used in the classroom students' responded cell phones are the device of choice then followed by Chromebooks and tablets.

Some of the cell phone features mentioned by students.

- It belongs to me and it is my personal device
- Affordability
- The size, mobility and ease of access to the device.
- The camera and video functionality
- The ability to store mass amounts of data
- The ability to take this data with them anywhere.
- The ability to download apps including educational apps
- Ability to access content any time in real time.

Challenges

Some of the challenges mentioned by students:

- Devices provided by the school were too restrictive in available content.
- Electronic devices could be a real distractor as peers share non-related content with each other particularly music videos and games.
- Social media overused in the classroom.
- Old computers
- Slow network
- Social harm / cyber bullying
- Teacher not knowing how to use software
- Computers are taking over our library
- Why don't we have computers like the school down the road, they have flasher ones and better learning apps

Improving Technology

Students suggested:

- Faster and consistent connectivity was required so they can consume content whenever they wanted in real time.
- More storage space for music videos and entertainment videos.
- More Virtual Reality should be in every classroom.
- Global classrooms that connect students all around the world
- Flasher computers
- Better up to date software and apps
- More access to internet sites and web pages
- Free laptops for all YR13 students
- Need easier programming software, the language is difficult to understand some times

Teacher Practice

Students state although one of the advantages is providing tablets to keep off task students quiet this means the teacher and student miss personal interaction. Furthermore, teachers did not monitor these students as closely as they could have.

Further comments from students on Teacher Practice:

- One student referenced a situation where an iPad on a mobile stand has replaced the doctor then suggested this means one day a robot can replace teachers.
- Why do I need a teacher when I can learn everything on Google or You Tube?
- My teacher is not good with computers so this means they cannot help me too much
- Computers are everywhere so we just use them for all sorts of stuff even when we don't have to use a computer
- It is so much easier when the teacher uses the computer to teach us.
- Science is better because we do not have a lot of the flash equipment like other schools but we still do cool experiments.

Learning Outcomes

Several students are not confident digital technologies have improved their learning outcomes and viewed digital technologies as 'flash work books'. Students also mentioned their anxiety around the introduction of online assessments. Some students claiming the school down the road was using different software and they felt they are disadvantaged.

Conference

Attending the Twenty Sixth International Conference on Learning in Belfast Northern Ireland I met with and heard from international speakers presenting their educational findings on Digital Technologies in Education. The following are snippets from many of the speakers at the conference. There are too many to reference individually but all presenters have strong commonality and links on the current trends and future aspirations of digital technologies in education.

With almost half of the world connected online and a third of the world's population using a smartphone today you could say we are a digitally connected world. Digital technology is more affordable and commonplace in many corners of the world including the use of smart phones in the classroom. This hand held device favoured amongst students with its ability to call home, capture and store photos, videos and notes of your adventures. These can then be shared simultaneously and instantly around the world with friends and family informing them of your travels, intentions and aspirations. Moreover, they are more than a recording device allowing two-way transmissions in the form of phone or video conferencing.

Stronger and faster networks enable real time learning between classrooms around the world. This will become more common especially for isolated communities connected online. Distance learning is not new but as technology improves more and more communities are embracing online learning. Examples of global collaborations are available on YouTube where musicians come together to learn and perform a musical piece. Wei Cui (2019) suggests the integration of digital technology and curriculum does not mean that digital technology is merely a tool that aids teaching or learning but can be used to create a new type of learning environment where resources can be shared and teaching and learning is a collaborative thing.

Digital devices has not only just replaced the note pad and pen but it has become a tool used in every area of the learning environment. With approximately 75% of teachers' using digital technologies in the classroom, blended learning has become a more frequent topic around educationalist. Blended learning combines online educational resources and opportunities to interact online with traditional teaching and learning practice. Blended learning requires more than integrating technology into the classroom as the teacher plays an integral role by personalising and streamlining the learning process for students. Nora Revai (2019) suggests blended learning environments can be established where students have a blend of online learning, face-to-face learning and practical hands on experiences.

Many presenters argued for better policy on upscaling innovation and evidence. Upscaling innovation is mobilisation and how we take good practice and share it with other schools. The education sector also needs to identify the best methods to gather, analyse and share evidence that this practice is fit for purpose. For this to work on a global scale the entire sector must be committed to making a change and the learning process must remain the domain of the teachers.

Security and privacy is always a concern for many. Digital data is literally floating around in the air and those with the skills and intent can intercept these. These actions can lead to activities by 'Hackers' such as cyber breaches to produce spam or phishing emails. All of these are disruptive and cost organisations millions of dollars every year to counter. Furthermore, organisations using cloud technology must ensure their systems are secure as breaches occur and information stolen. However, with these risk organisations spend billions of dollars around the world in a race to develop and introduce the best technologies. The human race has become increasingly more dependent and demanding of newer and faster technologies.

Readings

Traditional concepts of learning meant going to school and learning through a book alongside a teacher. Digital technology has changed this as learning begins to move away from the walls of the classroom. In the future instead of asking how we can improve schools, we may have to ask the question of how can we help learners to create their own pathways (Collins and Halverson). In the future, lifelong learning may require moving away from traditional schooling systems and offer learners a variety of learning experiences in a range of settings not confined to any one space.

Children and young people are creative and potent when using digital technology today. Given the reach and accessibility of digital technology young people along with their teachers and parents are both more empowered and more exposed than they have ever been before. This requires new ways of considering the challenges ahead (Craft, 2012). Furthermore, children must develop critical awareness of the consequences of globalised capitalism and extension beyond individualism.

Computers in school can help increasing student achievement by making classes more engaging and relevant, tailoring programmes to suit students and offering teachers a wider range of professional tools (Zucker, 2008). To focus on raising student achievement through standardised test results is limiting as other vital goals like socialisation and engagement in the learning process are just as vital. Although it is hard to measure, developing a passion for lifelong learning should be a goal.

A concern with the ease and immediacy of digital information may lead to a resistance to the patience and persistence required for in-depth scholarship. Data from the Kaiser foundation in 2010 found that when teens are doing their homework at a computer, two thirds of the time they are also engaged in surfing the internet, on social media, or messaging friends (Geidd, 2012)

Conclusion

Digital technology appears to be here for good. It is everywhere and to get rid of it would be near impossible. However, before you rush out and invest in the latest digital technology it is important to ask yourself a couple of questions first.

Is it going to improve my students' achievement levels?

What do I want my students to achieve?

What technology is required?

Is the technology fit for purpose?

Do you have policies and procedures that are fit for purpose?

Who is going to maintain your system?

How much do you invest?

New technology or quality teacher?

How will I know the system is secure?

Either way you decide there will always be sceptics on both sides of the fence. There are strong arguments for both camps but as long as you focus on what is important for your organisation then I cannot see any disadvantage with blending digital technologies into your learning programmes.

Readings

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