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- book reviews.

Publisher: The Technology, Environmental, Mathematics and Science (TEMS) Education Research Centre, which is part of the Division of Education, The University of Waikato, publishes the journal.

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Cover Design: Roger Joyce

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ISSN: 2382-2007
Online addictions are real: What are technology educators doing about it?

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Abstract

There are now five technological areas included in the New Zealand technology curriculum, two of which are based on digital technology. Like many other subjects, technology education encourages students to conduct research, consult with experts and design digital products. Increasingly, Generation-Z students use digital resources for learning, collaboration, and research, rather than face-to-face, phone, or letter communications, which are considered anachronistic. There is evidence that this improves the educational experience for most learners, but evidence for the impact on students and teachers who suffer from online and digital addictions is sparse. To ensure safe online practices for children, many countries have developed security guidelines and policies. Most of these efforts are aimed at keeping children safe from predatory interactions; preventing inappropriate content from reaching children; and minimising security breaches, such as viruses, phishing, or scams. The strategies vary, but commonly include reducing screen time, implementing web security processes, and providing guidelines for parents and teachers. Generally, this protection focuses on protecting the user from others but not on protecting learners and teachers from themselves—particularly from compulsive online behaviours. With the recent advent of COVID and increased exposure to working, teaching and learning remotely, online and digital addiction issues have been exacerbated. It is now timely to consider options for supporting people suffering from digital addictions and those at risk. This article discusses some current trends and issues related to online and digital addictions and their implications for technology education students and educators.

Keywords

Digital technology; addiction; technology; computer; school
Introduction

Adapting to change is challenging yet necessary for everyone’s survival. Aotearoa New Zealand, a small archipelago in the South Pacific with a population of just over 5 million, was initially settled by Māori who travelled from Hawaiki. Later, it was colonised by Europeans and soon became home for newcomers from all over the world. Due to isolation and lack of traditional resources from their “homeland”, these early settlers needed to be innovative to survive and flourish in this new environment. These were people who could solve a problem with the limited resources at hand, adapting or inventing solutions. They became a nation of people who are now often seen as “early adopters” of innovations (Davis, 2017; Eppel & Allen, 2020) in many areas, including technology. An example of this being New Zealand Māori Te Kura providing a full-time distance learning programme to K-12 students in the 1920s (Davis, 2017). But what happens when the modern solution is the problem? This paper will discuss the issue of how the prevalence and daily required use of devices and the internet have made life so difficult for those teachers and learners with online and digital addiction issues.

As technology teachers generally spend ever-increasing time using devices and being online, this exploratory paper provides a basic overview of the role and place of the digital technologies area and e-learning in the current New Zealand technology curriculum. This section is followed by an outline of the benefits and issues faced by learners and teachers when utilising digital tools and technologies. The paper further investigates current literature on digital and online addictions and problematic internet use (PIU) and highlights some strategies to support teachers and learners with digital addictions. The paper concludes by suggesting future directions for research.

Technology education in the New Zealand setting

Technology is defined in the New Zealand Curriculum (NZC) as “intervention by design; the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities” (Ministry of Education, 2017a, p. 1).

A compulsory subject in New Zealand for over 25 years, technology education has already seen several iterations. The first technology curriculum was published in 1995, held three strands (technological knowledge and understanding, technological capability, and technology and society) and eight achievement objectives (Ministry of Education, 1995). The second revised technology curriculum was published in 2007 and contained three new strands (nature of technology, technological knowledge, and technological practice) and eight components and achievement objectives (Ministry of Education, 2007). A third version was published in 2017, building on the 2007 curriculum, with the addition of five new technological areas, two of which have a digital focus (Ministry of Education, 2017b).

Over the last decade, there has been a push to move from digital literacy to digital fluency. Digital fluency supports teachers, kaiako, ākonga and students to confidently and effectively use digital technologies to enhance teaching and learning outcomes (Ministry of Education, 2022c). In recent years, there has been much development and support for teaching and learning in digital fluency. Current Ministry of Education professional learning development (PLD) priorities include digital fluency (Ministry of Education, 2022c) and there are now 206 accredited Ministry of Education facilitators providing government-funded professional learning (Ministry of Education, 2022c). Within digital fluency, there are distinct categories: digital technologies and e-learning (digital technology/information & communication technology). E-learning is learning and teaching facilitated by or supported through the use of smart information and communication technologies (Ministry of Education, 2006), whereas digital technologies comprises “learning about technology. It involves learning to be a creator in the digital world, not just learning to use systems” (Ministry of Education, n.d.-b, p. 1). By following a technological design process, students learn how to think logically and computationally to design and create digital solutions for authentic needs and contexts.
Teachers are encouraged to integrate digital fluency into their teaching practice, as Wright stated, it is the “role of the teacher to harness these tools purposefully and to teach students to benefit from using these ubiquitous tools for learning” (Wright, 2010, p. 46).

From 2018 to 2020, Kia Takatū ā-Matihiko, the digital readiness programme, was created to support teachers and schools to develop strategic planning for teaching and learning in digital fluency, in particular digital technologies, based on the revision of the 2017 technology curriculum (Ministry of Education, 2017a). Essentially, e-learning is the use of digital tools to communicate, collaborate, and use resources, and digital technologies is the creation with and of tools to solve authentic needs and problems in society. Figure 1 demonstrates some of the differences between e-learning and digital technologies.
With the 2017 revision to the technology curriculum, there is greater consideration of digital technologies—two of the five technological areas focus on developing students’ capability to create technological outcomes for specific purposes (Ministry of Education, 2017b). Within the digital technologies, there are now two foci, computational thinking (CT) and designing and developing digital outcomes (DDDO), each with its own set of progressive learning requirements, known as progress outcomes, that are separate to the three main strands of the technology curriculum. The technology curriculum is compulsory for all students in Years 1 to 10, and optional for Years 11 to 13.

Students develop knowledge and skills in CT and DDDO, as the intention of the digital technologies’ curriculum content is to “significantly contribute to students developing the knowledge and skill they need as digital citizens and as users of digital technologies across the curriculum” (Ministry of Education, 2017a, p. 3).

New Zealand has a second curriculum (Te Marautanga o Aotearoa), which supports the learning of Māori students in kura (schools). As part of the Hangarau Matihiko (digital technologies) technological area, there are two branches of specialisation: Te Whakaaro Rorohiko (computational thinking), which includes using te reo Māori to express problems, formulate solutions, and solve them using algorithms, program and data representation, and Tangata me te Rorohiko (people and computers) which involves designing and developing digital outcomes while considering their role and responsibility as digital citizens (Ministry of Education, 2017b).

Technology education is taught in many ways in schools across New Zealand. Schools are encouraged to develop student graduate profiles or strategic planning incorporating progressive digital learning in a variety of curriculum areas including technology (Ministry of Education, n.d.-a).

In the primary sector, Year 1 to Year 6, most technology lessons are taught by a “general” classroom practitioner who needs to teach every curriculum subject in one classroom space. Some primary level educators focus on the digital technologies area as a “siloed” subject, teaching it on its own, whereas others use an integrated curriculum approach through play-based methodologies, inquiry/project-based learning, or STEM/STEAM (science, technology, engineering, arts, mathematics) to provide opportunities to deepen digital technologies and develop digital fluency. In middle schools (Year 7 to 10), the primary classroom model can continue; however, here we see the introduction of technology specialists who either teach pure digital technologies or integrate digital technologies and e-learning into their own technological learning space. At secondary level, the technology aspect of digital technologies is specialised with classrooms comprising computer suites dedicated to this learning. However, there is still the expectation that digital fluency is incorporated across curriculum subjects.

With an increase in BYOD (Bring Your Own Device), distance learning due to COVID-lockdown situations, and new teaching approaches (such as blended learning and hybrid learning), general classroom teachers and specialist technology teachers have experienced a marked increase in learning time with devices and online learning. To aid continuity of learning for students, either in class or when isolating at home, there is a greater expectation for teachers to set up a school presence in a digital form (Ministry of Education, 2022a).

Technology education itself is partially responsible for the growing use of digital tools and devices in New Zealand schools. Not only does it have the subject specialism of digital technologies, but it encourages the use of digital hardware, such as 3D printers, laser cutters, robotics, and software (e.g., graphic design packages, CAD [computer-aided design] and programming), in all other technological areas.

The technological strands support students to work through a design/thinking process in which they are expected to use e-learning to communicate with clients/stakeholders, research by collecting data and

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analysing results; contacting industry experts to support their study; design, develop, and test ideas (and show evidence of this process); plan the process; and write evaluative reports. Technology develops the key skills of collaboration and communication and uses many different types of software to aid and guide learners in these tasks. The effects of the increasing use of e-learning and digital technologies in education may vary; while holding a promise for better learning outcomes, in some cases, they may also cause challenges and issues.

Positive and negative outcomes for learners

Equitable access to devices and access to the internet at home have been identified as ways of reducing the achievement divide. A few of the countries that have supported home internet access include Singapore (Lim, 2009), Israel (Zilka, 2017), Norway (Brand, 2018), the United Kingdom (Home Access, 2010), and many states in the United States of America (for example, Digital Promise, 2014). Children who are competent users and creators conversant with digital technologies have been shown to achieve greater educational outcomes (Brandtzaeg, 2016), higher engagement in classroom learning (Newton, 2018), and have higher cultural and social capital (Hargittai & Hinnant, 2008) than those who have less access, time, support, and ability. In a recent New Zealand study investigating the education value (learning, psychological, and social domains) of home internet access, 68 studies reported a positive learning outcome, four reported neutral outcomes, and six reported negative outcomes (Starkey et al., 2018).

However, the use of devices per se, is far from being the panacea for all educational ills. For instance, Beland and Murphy (2016) warn against distractions and the loss of productivity caused by devices and report an increase in student performance after banning mobile phones in schools. Specifically designed to be addictive, many online games, social media, and online shopping platforms are constantly enhanced to captivate the users’ attention and maximise the time users spend using these services (Abbasi et al., 2021; Marengo et al., 2022; Rigby & Ryan, 2011). Gecikli (2020) concluded that “[y]oungsters and adults feel incomplete during the hours they aren’t using their phones” (p. 1), and that younger users with free and unlimited internet access tend to be more exposed to the risks associated with devices and the internet (Kuss et al., 2013; Tang et al., 2017). Romania developed a voucher system to increase home computer use amongst disadvantaged families. Some children reported increased computer skills; however, the majority reported a surge in playing computer games daily. The research also suggested that less time was spent doing homework and reading (Malamud & Pop-Eleches, 2011). Hence, having access to devices and the internet does not necessarily equate to improvement in academic grades (Fairlie & Robinson, 2013).

The effects of internet expansion permeate all spheres of human life, including education, work, social interactions, consumption, entertainment, and privacy. Unlike traditional television, smartphones allow access to an unlimited range of content at any time, and any place (Jung, 2014). Most people are inseparable from their phones (Turkle, 2011), which results in co-present interactions, where one or more people are physically present, but the conversation occurs via mobile media (Burchell, 2017). Young people especially tend to continually check their digital devices for fear of missing out (FoMO) (Klimmt et al., 2018); some studies linked FoMO to smartphone addiction (Davey & Davey, 2014, Kwon et al., 2013, Salehan & Negahban, 2013) and problematic mobile phone use (Cheever et al., 2014; Lepp et al., 2014). The coinage of the term “phubbing”, where a person you are speaking to is snubbed for a smartphone (Schneider & Hitzfeld, 2019), marks a rapid shift in communication etiquette and an increasing acceptance of such behaviour as a current social norm (Chotpitayasunondh & Douglas, 2016). Phubbing, the dynamics between phubbers and phubbees, and related changes in social norms are now commonly researched (Cahir & Lloyd, 2015; Rainie & Zickuhr, 2015; Schneider & Hitzfeld, 2019; Vorderer et al., 2016); however, this remains outside the scope of this paper but indicates a growing awareness of issues related to mobile phone use.

While enjoying the benefits and convenience brought by Web 2.0, the public is aware of the risks linked to the use of devices and the internet, especially for young users. These risks are often associated with...
external threats, such as data harvesting or hacker attacks. With cyber-security now at an all-time high, many countries have developed security guidelines and policies to ensure safe online practices for children (International Telecommunication Union, 2020; UNICEF, 2015). New Zealand has developed several strategies and support structures for the safe use of devices and the internet (Ministry of Education, 2022b). These safeguards mostly focus on protecting children from bullying and harassment; reducing their possible exposure to inappropriate content; preventing or minimising security breaches, such as viruses, phishing, or scams. These strategies may vary, but commonly include web security processes, reducing screen time, and providing guidelines for parents and teachers to ensure “safe online practices” (Ministry of Education, 2022b; UNICEF, 2015).

However, these recommendations attribute little importance to the mental health and well-being issues triggered by the excessive use of devices, in particular, in situations when study, work, shopping, entertainment, and social life suddenly moved online, especially for those who already have a large element of their working hours online (Gurvich et al., 2021). Before the COVID-19 pandemic, over 26% of students reported spending more than six hours per day online during the weekends, and 16% reported a similar amount during weekdays; these students were more likely to feel lonely, have low expectations of their future education, and arrive later at school (OECD, 2017). Many parents feel their children are becoming obsessed, addicted, or dependent on their smartphones or tablets (Bergert et al., 2020). A Korean study of five year olds found negative developmental effects of using the devices, specifically, that higher habitual computer use was associated with lower socio-emotional development (Hyun et al., 2011). The recent research by Smith and colleagues (2020) highlighted an increase in screen time during the pandemic and the consequent physical and mental health risks related to excessive (yet often unavoidable) use of devices and the internet. The most significant physical health issues include the risk of myopia and eye strain, disrupted sleep cycles (Singh & Balhara, 2021; Wong et al., 2021), and a decrease in physical and outdoor activities (Bahkir & Grandee, 2020). Physical symptoms, such as muscle pains, obesity, or carpal tunnel syndrome, are often accompanied by mental health issues, ranging from irritability and difficulties in concentration to mental illnesses, such as anxiety, depression, and attention-deficit hyperactivity disorder (Király et al., 2020; Meyer et al., 2020; Oberle et al., 2020; Stavridou et al., 2021). Other mental health impacts manifest in attention-deficit symptoms, impaired emotional and social intelligence, social isolation, phantom vibration syndrome, and technology addiction, e.g., gaming disorder (King et al., 2020; Lodha & De Sousa, 2020; Oswald et al., 2020). Nevertheless, recognition, classification, diagnostics, and treatment of internet addictions remain contested terrain (Kuss et al., 2017). The issue of compulsive behaviours online is rarely discussed in the technology education literature; however, the implications of digital and internet addictions on teaching and learning require further investigation.

Digital and online addiction issues

Over the last decade the divide between those with and without access to devices and the internet has reduced (OECD, 2015). Globally, internet use has surged by 1,332% between 2000 and 2021 and, as of March 2021, the number of active internet users exceeded 5 billion. Facilitated by the increasing accessibility of devices, apps, and technologies, the average internet penetration rate reached 66% worldwide with a high of 94% in North America and a low of 43% in Africa (Internet World Stats, 2021). Whilst more people have gained access to the internet and routinely engage with devices and the internet, internet addiction (Lopez-Fernandez & Kuss, 2020) has now become a serious threat to users’ mental health and wellbeing (Kuss & Griffiths, 2012).

The global pandemic of 2020–2022 added a new dimension to the discussion of digital technologies in education, and in technology education, in particular. During the prolonged periods of nationwide lockdowns, online learning became an acceptable and often the only accessible education mode (Dhawan, 2020). As a result of COVID, the physical and metaphorical walls, which traditionally separated a school from its community, have become more permeable, and online/virtual learning has become mainstream (Core Ed, 2020). Whilst the research has shown that the use of devices generally
delivers positive outcomes for most learners (Starkey et al., 2018), the efficiency and implications of the pandemic “emergency” delivery mode for a wide range of learners and educators is yet to be assessed from both educational and mental health perspectives.

A saviour for many, digital devices and the internet have also been a significant contributor to raised internet addiction levels (Gupta et al., 2020). The research of internet addictions has originated and saturated in the fields of clinical psychology and psychiatry (Cash et al., 2012; Kuss & Griffiths, 2012; Kuss & Lopez-Fernandez, 2016) with minimal literature highlighting internet addiction issues in education. Over two decades ago, researchers identified that social pathologies existed in cyberspace in the form of technological addictions (Griffiths, 1999; Marks, 1990). These compulsive behaviours contained the core components of addiction: salience (dominates the person’s life), mood modification (reaction when engaging in the activity), tolerance (increasing amounts of the activity are required to achieve the same effect), withdrawal (effects when the activity is discontinued), conflict (conflicts involving the activity), and relapse (tendency to revert to earlier behaviour patterns) (Griffiths, 1999).

The notion of internet addiction disorder (IAD) (Goldberg, 1995) precedes the more holistic term, problematic internet use (PIU) (Shapira et al., 2000), which is also sometimes referred to as high internet dependency (Hur, 2006), pathological internet use (Davis, 2001), excessive internet use (Hansen, 2002), and compulsive internet use (Widyanto & Griffiths, 2006). Various forms of IAD and PIU, including hacking (Shotton, 1991), computing addictions (Turkle, 1995), cyberspace addictions (Suler, 2004), and virtual relational addictions were also investigated in the literature. The research on internet gaming addictions (Salicetia, 2015) has gained significant traction (Kuss & Griffiths, 2012; Wang et al., 2014; Young, 2009). In 2013, the American Psychiatric Association included internet gaming disorder (IGD) in the Diagnostic and Statistical Manual of Mental Disorders (commonly referred to as the DSM-5). The World Health Organisation (WHO) officially recognised gaming disorder (GD) as a diagnosis in the International Classification of Diseases (ICD-11) (WHO, 2018). The official recognition of IGD and GD opens a pathway for discussions on whether these disorders constitute a learning problem and should be accommodated accordingly by education providers.

Implications for technology education students and educators

Even in the pre-smartphone era (prior to 2007), excessive internet use was regarded as “a real addiction and of genuine concern” (Griffiths, 1999, p. 250). Whilst more recently, several digital addictions have been classed as diagnosable mental health conditions. China is one of many countries concerned about these disorders with up to 13.7% of Chinese adolescent internet users meeting internet addiction diagnostic criteria, equating to approximately 10 million teenagers (Block, 2008). Whilst research into childhood, teenage, and university student addiction is common (Lodha & De Sousa, 2020; Oswald et al., 2020), there is a dearth of research focusing on addiction levels of teachers. As the number of internet users increased tenfold from 1999 to 2013, to the current level of over five billion users (Internet World Stats, 2021), one must presume that teachers would represent a proportion of these statistics.

Knowing that a proportion of our teaching population will have digital addiction issues and mandating them to work totally online, to deliver online teaching, online engagement with students and parents, online planning, and online reporting is a concern. It would be unconscionable to mandate that a person with a gambling addiction work in a casino or an alcoholic work in a bar, yet this is what many teachers were forced to endure. Previously, teachers could divide and limit their time online; however, as soon as learning moved to online these support structures were removed. When COVID arrived, many professional activities moved online; however, the ramifications for the teachers and learners with internet and digital addictions were unprecedented.

With technology education in New Zealand demonstrating many facets that encourage and expect the use of digital technologies, teachers and students need to be made much more aware of the implications and risks of more frequent and regular online and digital use. Teachers need to be cognisant and able to provide strategies in teaching and learning that reduce addictive tendencies in students. During class
time, evidence suggests that supplementing standard teaching rather than replacing it with technology interventions can have the most positive impact on student achievement (Higgins et al., 2012; Lewin et al., 2019). Teachers need to think carefully about the benefits of using a digital tool and the impact of learning by utilising digital technologies or e-learning. Can the activity be taught without the need to be online or using a digital device? As MacCallum and Brown (2021) stated, devices should clearly add value or improve teaching and learning, not simply replace traditional practices. Other strategies for technology students who need to be online for their learning could include regular breaks from the screen, the use of unplugged activities to teach computational thinking and the setting up of learning tasks that can take place away from a digital device or reduce time physically using digital tools, for example, create a mindmap brainstorm using paper, pen, and post-it notes and taking a photograph to show evidence of the work as opposed to using a tool like Google Jamboard, which encourages students collaborating online.

Recommendations

Prior to COVID, support for those afflicted with this addiction varied. The research suggests some coping strategies that can be helpful in preventing negative effects of PIU, starting with detecting early warning signs of addictive tendencies and switching from using digital media to physical or no-screen activities (Király et al., 2020). Most researchers admitted that total abstinence was neither possible, nor helpful, but rather abstinence from problematic applications and the development of controlled and balanced internet usage might be a desirable goal (Petersen et al., 2009). The approaches to tackling PIU and digital addictions depend on the severity of the issue and may include pharmacological or psychological interventions. A non-psychological, pharmacological approach with the use of selective serotonin reuptake inhibitors (SSRIs) because of the co-morbid psychiatric symptoms (depression and anxiety) of IAD (Huang et al., 2010). Some common psychological approaches focus on self-help coping strategies, such as accepting the issue; identifying its triggers; tracking, scheduling, and moderating of screen time; practising digital detox and digital dieting; and reinforcing and rewarding positive behavioural changes (Gupta et al., 2020). Others supported psychological measures, such as physical exercise to compensate for the decrease in the dopamine level due to limited online usage (Greenfield, 2000; Lanjun, 2009), engaging in family therapy (Peukert et al., 2010), motivational interviewing (Miller, 2010), reality therapy (Kim, 2007), acceptance and commitment therapy (ACT) (Twohig & Crosby, 2010), cognitive-behavioural therapy (CBT) (Widyanto & Griffiths, 2006), or a multimodal approach utilising a number of strategies (Du et al., 2010). Approaches that changed patterns and timing of internet use, prompted or limited engagement, including time-related goals, abstaining from specific applications, using reminder prompts of the costs and benefits for behaviour change, developing a personal log, attending support groups and engaging in family therapy, were all shown to be effective in changing addictive habits (Young, 1999).

However, as a result of COVID, we now need to learn to use and adapt these well-established support strategies as they apply to ever-changing situations, to ensure secure behaviours and enhance users’ well-being and quality of life (Lopez-Fernandez, 2020; Young, 2013). The pandemic has also taught us the importance of regular sleep and exercise, routines, a healthy diet, stress-reduction techniques, maintaining relationships, alone time if living in a family group, and following World Health Organisation updates, whilst also minimising excessive exposure to news updates. Specific measures also include monitoring and regulating screen-time, role-modelling reducing the time on devices, using well-being apps and analogue technical tools (e.g., watches), keeping in touch with friends, and seeking help (Király et al., 2020). Numerous prevention programmes have been developed for schools (Carbonell et al., 2018; Ministry of Education, 2022b; Neverkovich et al., 2018), but, generally, these are designed to keep a user safe from others and do not specifically address internet addictions. Little, if anything, is designed to keep learners and teachers safe from themselves, and often self-diagnostics and self-help remain the only accessible options to tackle the PIU. Few guidelines have considered the impact of lockdowns and the COVID-related hybrid learning and compulsory teaching of digital fluency and technologies on those afflicted with digital addictions.
We all react to situations in different ways, and through no fault of their own, a proportion of people, including those in our teaching and learning community, have digital addiction issues. Teachers who are expected to teach technology online and face-to-face have the added difficulty of not being able to utilise some of the classical coping mechanisms and support approaches. These teachers are expected to be cognisant of the latest digital technologies and their use; hence, their role requires a personal online experience and presence. Due to the demands of the profession, these technology teachers cannot easily change the time of their online usage, nor limit their time online; as for many, it is their job to be online.

**Recommendations for future research**

The technology education sector has a key role in preventing digital and online addictions. Even after 20 years of research, there is still a need to raise awareness and inform users about the risks (Lopez-Fernandez & Kuss, 2020). More research is needed into the drivers of online addictions. Is technology seen as the medium of communication and connecting with others (ability to have online interactions), a source of information, or access to an activity (gambling, computer games)? Is an addiction driven by the cost, instant gratification, ability to become “famous”, anonymous, or partake in an alternative reality? Or whether it is a result of poor mental health or poor parent/child relationships. How do these drivers affect teaching and learning, especially when intensive use of devices and digital resources is required?

How can we ensure the students and teachers involved in technology education are aware of the issue and provided with strategies to manage and mitigate the issues safely? How can we strengthen the role of the Nature of Technology to include such issues to increase student awareness?

**Implications for technology education**

The scale of the digital and online addictions’ issue in technology education is yet to be determined as well as the effective support strategies for those suffering from digital addictions and who are exposed to working in a digital environment. Those working in the technology education field, and hence most at risk and possibly most affected, need to be prioritised. COVID must have hit this group hard and yet their plight has gone undetected thus far. Accepting that: 1. the PIU issue exists and is being exacerbated in the “new normal”; 2. that it might affect an increasing number of educators and learners, particularly in technology education; and 3. that the issue should be formally recognised to enable adequate support mechanisms is essential for mitigating the long-term physical and mental health impacts of the PIU. Therefore, further research on digital addictions among teachers and learners and the ways of mitigating these in the educational contexts is an urgent matter.

**Acknowledgement**

This paper has been adapted as a result of feedback gained from a presentation given at the 2022 PATT 39 Conference, St John, Canada (21–24 June).

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Australasian Journal of Technology Education, Special Issue: Technology Education on the Edge, Vol. 9, 2023


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