

Were we ready? New Zealand high school students' experiences of online learning during school closures of Covid-19, 2020

Anne Yates

Victoria University of Wellington

Louise Starkey

Victoria University of Wellington

The Covid-19 pandemic of 2020 resulted in New Zealand schools closing and teaching moving to online. This paper reports research which investigated senior high school students experience of learning from home during these school closures and anything about the experience that they would like continued in the future. High school students in their final two years of schooling (n=1975) responded to a questionnaire consisting of quantitative and qualitative questions with qualitative data analysed thematically and quantitative data with descriptive statistics. Findings revealed that a variety of learning activities, feedback on learning, positive social interactions and effective use of technology supported students. A lack of motivation and daily structure were the major hinderances. The key experience they would like continued was greater flexibility in their learning. Schools demonstrated varying degrees of readiness for the crisis, but findings showed the need for resilience plans which include policies and practices for student and teacher digital readiness in preparation for future crises which result in emergency online learning.

Keywords: Covid-19, school, crisis planning, online learning, digital

Introduction

The context of teaching is changing with increasing access to digital technologies, devices, the Internet, educational programmes, online learning environments, and communication tools that enable online interaction and collaboration (Selwyn et al., 2017). Schools have been moving at varying speeds to becoming “digitally infused” (Starkey, 2020) with digital technologies becoming embedded within the work of teachers. This includes using technology for teaching and learning, managing digital learning environments, and the professional work of teachers, such as the use of student management systems and data analysis tools.

When the Covid-19 pandemic first swept the globe in 2020, the New Zealand government initiated a policy to contain and eliminate community transmission of the virus, which required people to isolate at home and to restrict contact to only those in their household ‘bubbles’ from midnight 25th March 2020. The school holidays were brought forward to give teachers nearly three weeks to prepare for remote education from 15th April 2020. Remote education continued until 18th May 2020 in this first lockdown after which schools re-opened for face-to-face instruction.

The New Zealand Ministry of Education aimed to support emergency remote home learning by:

- providing online resources across three websites
- working with schools to ensure that all students had Internet access, or printed learning resources where this was not possible
- broadcasting two television channels – *Home Learning* | *Papa Kāinga TV* in English and *Mauri Reo Mauri Ora* in te reo Māori

(ERO, 2020)

Literature review

Crisis planning

A crisis in education is “an event, often sudden or unexpected, that disrupts the normal operations of the institution or its educational mission and threatens the well-being of personnel, property, financial resources, and/or reputation of the institution” (Zdziarski, 2006, p. 4). Academic continuity through remote learning during time of crisis is not new. Previous crises that resulted in remote learning for academic continuity include evacuations in France during World War 2; Hurricane Katrina in the USA; and the Christchurch earthquakes (Regeher et al., 2016). Each of these crises resulted in emergency remote teaching through correspondence or online learning. Such disruptions to education are ongoing and therefore educational institutions need to have crisis plans (Mitroff & Anagnos, 2001; Mutch, 2015c; Rollo & Zdziarski, 2007). Crisis planning is a relatively new idea, yet the concept has existed for over 80 years (Regeher et al., 2016) and while institutions have plans for situations that need building evacuations or to recover data if technology fails, few have contingencies for academic continuity (Holzweiss et al., 2020).

The World Education Forum in 2000 agreed on the need for practical strategies to plan for the continuance of school education during emergencies and crises, and subsequently guidelines for planning for education in emergency situations were developed (Bensalah, 2002). These guidelines emphasised the need to prepare for emergencies where access to education is disrupted because education is important to children and young people. While the focus of these guidelines was lack of access to education due to natural disasters and/or political instability, the points equally apply to any cause for school closures. Bensalah claims that plans need to be made for: school and community communication and cooperation; professional development for teachers; adjustments to curriculum and assessment; at-risk groups; allocation of resources; and how these will be coordinated.

Other researchers (e.g., Mutch, 2020; Regeher et al., 2016; Zdziarski, 2006) have also emphasised the necessity of crisis planning to ensure the continuity of education. Zdziarski (2006) developed a five-step process consisting of (1) prevention and mitigation, (2) planning, (3) response, (4) recovery, and (5) learning. Regeher et al.’s (2016) framework is similar, but with four stages: pre-planning (which includes establishing policies); approaching crisis (activate committees and communicate policies); during crisis (implement policies); and post crisis (where policies and strategies are reviewed).

School-based research emerging from the Pacific has focused on disaster response and recovery in times of crises (e.g., Mutch, 2015a, 2015b, 2015c, 2016). This research has included post-earthquake responses in Canterbury, New Zealand, post-bushfires in Victoria, Australia, and post-disaster settings in Japan, Vanuatu, Nepal, and Samoa. From

this research, a model of crisis cycle has been developed (Mutch, 2020) with similarities to the higher education planning models but with greater emphasis on the response and recovery stages and ends with a sense of renewal.

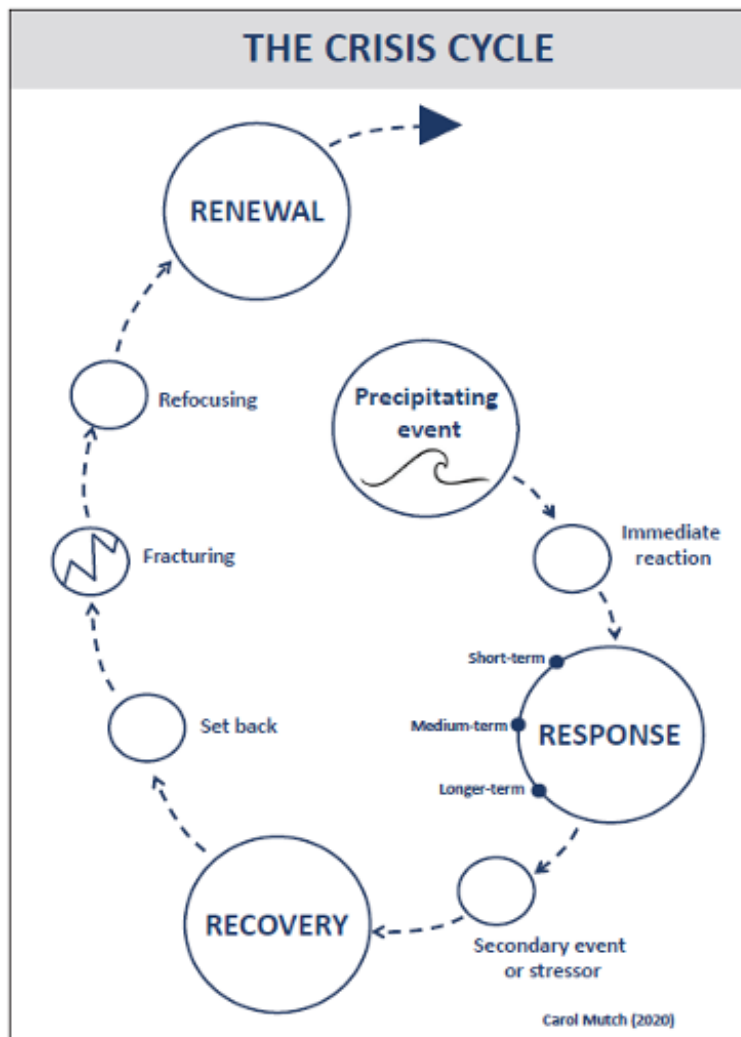


Figure 1. The crisis cycle (reproduced from Mutch, 2020)

Mutch's work, unlike that of Zdziarski (2006), Holzweiss et al. (2020) and Regeher et al. (2016), focuses on the schooling sector and concludes that schools play a significant role in disaster response because schools are intertwined with young people's lives and their families. No matter the disaster or crisis, schools continue in a key role, "teachers are seen as people who would know what to do even when they are not sure themselves" (Mutch, 2020, p. 4) and principals can become community leaders. Despite the difficulties in their own lives, teachers and principals are expected to get on with it. Disaster planning in education needs to consider continuity and the important role that schools play in the wider community.

Mutch's (2015a, 2015b, 2015c) research into the Christchurch earthquakes prompted her to call for more school and teacher preparation and planning for disasters, pre-service and in-service teacher education should provide professional development on the possibility of emergency events, how to respond to these and where they might get

help. However, Mutch (2020) claimed that despite this earlier recommendation she had yet to see this professional development occur. Since the worldwide school closures of Covid-19, there have been further calls for specific professional development for teachers in online and distance learning (e.g., Bozkurt & Sharma, 2020; Darling-Hammond & Hylar, 2020).

Remote learning

In response to the Covid-19 pandemic the OECD developed a framework to guide an education response (Reimers & Schleicher, 2020). The major recommendations include the need for countries to have a response plan – at both the national and individual school level. Plans should include provision of both online and other forms of distance education, professional development and support for teachers, strategies for how assessment will occur, communication systems to check in with teachers and students, and financial support. However, Reimers & Schleicher also claim that according to evidence from the OECD's Programme in International Student Assessment (PISA), most education systems in the world were not well prepared to offer remote online learning.

New Zealand fared better than the 2018 OECD average on most of the preparedness measures (Reimers & Schleicher, 2020) with 76% of students enrolled in a school whose principal 'agreed' or 'strongly agreed' that an effective online learning platform is available, 74% of students attend a school whose principal 'agreed' or 'strongly agreed' that effective professional development for teachers using digital devices is available, 76% of teachers felt that they could support student learning through digital technology, and 73% of teachers 'agreed' or 'strongly agreed' that most teachers in the school are open to change. Lower than the OECD average, only 41% of students attended a school whose principal 'agreed' or 'strongly agreed' that teachers have sufficient time to prepare lessons that integrate digital devices into learning. Despite being better than the OECD average, these pre-crisis figures suggest for New Zealand teachers "that the transition to remote teaching and learning may have been challenging for a number of teachers" (Reimers & Schleicher, 2020, p. 3). However, it must be considered that these surveys were carried out with teachers thinking about how technology would be used in classroom teaching, not using technology for remote education. Despite calls for preparation for such a crisis, it could be assumed that not all New Zealand schools and teachers were prepared but were expected to cope anyway.

In addition, to access digital learning students must have access to the technology and the ability to use it proficiently, and this access tends not to be evenly distributed in society. According to the 2018 New Zealand Census, 79.4% of New Zealand households have access to the internet (Statistics New Zealand, 2018). The OECD (2018) reported that 89% of New Zealand students have a quiet place to work at home; for students from advantaged schools this is 91% but 83% for students from disadvantaged schools. Similarly, 92% of New Zealand students report having a device on which to do schoolwork, but with 98% of those from advantaged schools having devices and 86% from disadvantaged schools. Starkey et al. (2017) describe a category of digital divide that focuses on capability in the use of digital technologies and concluded that "the digital capability divide in the schooling sector appears to have two components: the capability of teachers to teach using appropriate methods and knowledge that incorporate the digital technologies and Internet, and the digital capability of students" (p. 40). This capability is pertinent because students' ability to use the technology can facilitate or hamper their learning (Thoms & Eryilmaz, 2014).

Remote teaching can be an effective model of education in times of crisis. The Education Endowment Foundation (2020) published a rapid evidence assessment of remote learning where the authors summarised the findings of 60 systematic reviews and meta-analyses on remote, blended and digital learning. Their key findings were that students can learn through remote learning, which has long been claimed by distance educators such as pioneer Holmberg (1960), but that teaching quality is paramount. Elements of effective teaching, such as clear expectations, scaffolding and feedback must be present and that they are more important than how the teaching is delivered. There must be a range of approaches to remote learning to suit different tasks and types of content, and students need to be supported to work independently (for example, providing strategies students can use if they get stuck). Collaborative approaches to learning are valued and that if the remote learning is to be delivered through technology, then students obviously need access, not just in terms of a device but if programmes such as Zoom are to be used then broadband width becomes important. The Education Endowment Foundation published these findings to assist schools and teachers during Covid-19 school closures. While their suggestions are useful and evidence-based they appeared too late for New Zealand schools, although the reviews they summarised have been available for some time. However, it is unlikely that teachers and leaders in New Zealand schools would have accessed such literature because for most this would not have previously been relevant, despite calls that schools should prepare for such a situation.

The need for crisis planning is clear, but there seems to be little evidence that New Zealand schools had well developed plans to provide education during school closures, possibly because a crisis, such as a world pandemic, was completely unexpected. However, New Zealand schools could be considered well positioned to offer online remote teaching and learning because nearly 80% of schools believed they have an effective online learning platform and nearly 80% of teachers believed they can support student learning through digital technology (Reimers & Schleicher, 2020).

Distance education

Covid-19 forced students to learn at a distance and there is a large body of literature on effective distance education. Holmberg (2005) considered the foremost condition needed for successful distance education is empathy and that teachers need to develop relationships with students, which along with empathy creates a feeling of belonging in the learning community, which in turn supports motivation. The critical role of motivation to engage in distance learning has long been recognised (e.g., Simpson, 2008), but rather than motivation residing solely with the student, Ng (2019) proposed the concept of distributed motivation whereby motivation lies not just with the student but also with learning materials, technologies and learning platforms. Hartnett (2016) supported this stance and found that factors associated with teachers could either support or undermine students' motivation to study online. Supportive factors included timely feedback that fostered perceptions of competence, providing learning approaches that were authentic and related to student interests, and inclusive teaching practices that led to feelings of belonging by the students. Undermining factors included insufficient guidance and feedback from teachers, and perceptions that the need to contribute to asynchronous discussion as controlling and not serving any purpose, unclear guidelines on how to complete the work, excessive workload and not feeling part of a learning community.

Moore (1993) described the distance between teachers and learners as "transactional distance" which is pedagogical rather than geographical distance. This

distance is determined by the variables of dialogue, structure and learner autonomy. Dialogue refers to valued interactions, and structure is whether an education programme is responsive to learner's needs. Learner autonomy is the extent to which learners determine their goals and learning experiences. Structure, dialogue and autonomy are interconnected in that how a course is structured (e.g., planned use of synchronous video conferencing) allows more or less dialogue and the structure also demands more or less student autonomy. According to Moore (2019) the challenge for teachers is to design learning environments and experiences that take advantage of digital communication platforms and online resources by providing a structure that allows "numerous pathways to common goals" (p.41).

However, these distance education theories were developed from a field of education where resources, platforms and teaching methods were carefully considered and took time to develop and curate, not for the emergency situation created by Covid-19. It is also unlikely that New Zealand teachers would be familiar with these theories.

Education response to Covid-19

There is already a growing body of literature related to education and Covid-19. Education systems have been found to be generally unprepared and vulnerable to this threat (Bozkurt & Sharma, 2020). Many stumbled to merely upload educational content unaware that distance education involves far more than delivering content. The situation created by Covid-19 has been proposed as "emergency remote teaching" (Hodges et al., 2020, p. 1) to distinguish between this situation and high-quality online education. Bozkurt and Sharma agreed that this situation should be properly named as "emergency remote education" (p. ii) so as not to confuse education provided during Covid-19 with that of genuine distance education because "when things are settled and go back to normal, what people will remember will be bad examples from a time of crisis, and the years of efforts it has taken to prove the effectiveness of distance education can vanish all of a sudden" (p. ii). They also claimed that students won't remember the content but will remember how they felt, how they were cared for and supported.

From a synthesis of the impact of Covid-19 on schooling from 31 countries, it appears that education provided in a time of crisis should be developed from a "pedagogy of care, affection and empathy" (Bozkurt et al., 2020, p. 1). Other emerging themes include: the digital divide experienced by learners (Alavrez, 2020; Carver, 2020); the uneven impact on families, including inequity and social justice (Alavrez, 2020; Bozkurt et al., 2020; Carver, 2020); the need for more student-centred learning; and for educators be familiar with, and have some training in, online pedagogies (Bozkurt et al., 2020; Darling-Hammond & Hylar, 2020).

Bozkurt et al. (2020) also claim that the question is not what we did in the Covid-19 pandemic, but what we will do for future interruptions? Will we learn from our mistakes, or will we repeat them? Will education systems plan and train for more online and blended learning in the future? In a similar vein, Mutch (2020) also calls for principals and teachers to reflect on the situation created by Covid-19. What worked well? What could have been done better? What support do schools and teachers need? Flores and Swennen (2020) also call for more research to inform the 'new normal' of more online teaching and learning in the new educational landscape. Furthermore, we need to listen to the students. What worked for them? What didn't? What were their needs? Mutch (2020) calls for students to be listened to: "They have a right to participate in issues that relate to them. We need to listen to their views ..." (p. 6). Disruption to education is not limited

to pandemics. Natural disasters such as earthquakes, wars and civil conflicts can also interrupt schooling. It is essential that we know how best to serve students during such disruptions and that policies are in place to ensure planning occurs. Therefore, this research explored New Zealand senior high school students' experiences and perspectives of learning at home during the Covid-19 pandemic of 2020. The main objectives were to find out:

1. How New Zealand senior students experienced learning at home during the Covid-19 pandemic.
2. Aspects of teaching and learning during emergency remote teaching and learning that could inform the future of learning.

Methodology

A mixed method approach was used with data being gathered through an online questionnaire (see Appendix 1) using the Qualtrics survey tool. The questionnaire sought to ascertain students experience of learning remotely at home during school closures of Covid-19 in 2020. Questions focused on what worked for the students and what did not work, and any aspects of learning from home they would like continued in the future. Year 12 and 13 students from New Zealand schools were invited to take part because people over 16 years of age can independently decide to take part in research and were likely to be able to articulate their opinions clearly. They were recruited through their schools with emails being sent to school principals or deputy principals of schools with at least 100 students aged 16 years and over (total of 348 schools). Principals, or deputy principals, were invited to forward the questionnaire link to the relevant students at their school. Participants were offered the opportunity to enter a draw for a newly released PlayStation. Sixty schools and 1,975 students from across New Zealand participated of which 1,045 were Year 12 and 930 Year 13.

Qualitative data were analysed using abductive reasoning (Moscoso, 2019) drawing themes from the data according to what they thought was successful about remote online learning, what they found difficult, and what they would like to continue into the future. Emerging codes were developed through thematic analysis (Braun & Clarke, 2006) which allows patterns in the data to be noted. Quantitative data were analysed descriptively.

All student participants were anonymous and over 16 years of age, they consented to participate by completing the questionnaire. The identity of their schools is confidential to the researchers. This research was carried out with the ethical approval of the Human Ethics Committee, ethical approval [#28604].

Findings

What teachers did that helped students to be successful

Over 90% of participants stated that supportive teachers who checked in on them regularly, were cognisant of their individual situations and provided support for their wellbeing helped them learn successfully from home. Some students experienced the emergency as stressful and their normal support networks were limited, so appreciated teachers' regular communication to "check in on them."

Clarity, organisation and easy access to the resources were also important for most participants: Knowing what to do, how and when it had to be completed. Some teachers had particularly well curated learning management sites in which students accessed

content and information and which provided a structure that encouraged motivation while also giving flexibility to learn at their own pace. For example, the independent use of time was supported by teachers who used learning management systems to provide clear plans and access to an array of resources.

Learning activities that worked for students included using multimedia resources, direct instruction, collaborative activities, gamification and clear expectations. Multimedia activities such as watching movies, YouTube or teacher-made recordings were preferred activities offered by 25% of participants because they provided visual information, were different to text-based activities and could be accessed multiple times. Teacher-made or commercial videos were useful for immediate learning, and for revisiting topics, as one participant shared: “Maths explanations ... as it showed all the necessary steps in solving the problem, and she explained it clearly. It was easy as I could pause and go anywhere into the video if needed and understand it in my own pace.” Direct instruction was considered an efficient way to develop academic knowledge by those who were time conscious and was mentioned by approximately 20% of participants. They liked listening to the teacher and taking down notes in a lecture-styled way. Some found this more to the point and less time consuming than “active activities.”

Also successful were interactive, collaborative activities – offered by approximately 25% of participants as their favourite learning activity. Collaborative learning activities were reported in physical education, drama and Kapa Haka (Māori performing arts), where students synchronised performances and activities through platforms such as Zoom or Microsoft teams. Others used software such as PowerPoint to create collaborative presentations: “As a group we created a powtoon. ... I really enjoyed this task as it felt like we were in class collaborating together, even though we were in our own homes.” Well-managed online class discussions were another collaborative activity that enabled participation, and to some participants this seemed more orderly than in-class discussions because they weren’t talking over each other, and teachers were able to manage student engagement. In particular, students appreciated it when teachers used technology to facilitate small group discussions and activities.

Gamification, which included an element of competition either between peers or against themselves, was the most popular pedagogical approach with over 80% of participants stating this as one of their favourite learning activities. Examples given were online quizzes (e.g., Kahoot), proprietary products which incorporate gamification (e.g., Education Perfect), and teacher developed activities such as online scavenger hunts and bingo. These were enjoyed because they were fun and supportive, included social interaction and they provided feedback on academic progress.

Having fun while learning was also appreciated. Some examples were: “Our teachers would play the guitar while we would carry on doing the task that was set for us ... near the end of our class we would sometimes have a karaoke session” and “Every Zoom call for history we had a dress up costume and a theme which made the calls more enjoyable.” Others described teachers encouraging them to play musical instruments with family members for Music, to photograph people within their ‘bubble,’ to coach siblings for physical education and to watch TV programmes across the decades with parents for Media Studies.

What students found difficult

The hardest part of learning from home was the motivation to study with nearly 40% of participants citing they lacked motivation to do their schoolwork. They linked the lack of

motivation to a range of issues such as: family obligations, for example, looking after siblings or helping out at home or on the farm; distractions like Netflix or online shopping; inaccessibility of teacher or peer help when they were stuck; lack of extrinsic consequences for not doing schoolwork; and the lack of separation between home and school. Without the extrinsic drivers of school, routine, consequences, resources and easy access to teacher and peer support, many participants reported being unable to find the motivation to study.

Some participants struggled to self-manage, feeling they “had too much freedom. We had no one looking over what we actually worked on.” Some recognised that their lack of time management affected their motivation and learning and attributed this to “not having the routine of school, for example, getting up early, having bell times and specified breaks.” Others linked their lack of self-management with a perceived increase in workload with “teachers setting more work than we would have done at school” and a lack of co-ordination between subjects so that at times synchronous sessions clashed.

While most (60%) participants reported less than six hours of scheduled classes a week, some (11%) reported having to attend over 18 hours of online lessons each week. The extensive synchronous use of technology which transposed classroom routines and practices was not motivating. For example: “It was difficult to sit in front of a screen for an hour at a time, for five hours a day just listening to a teacher talk with not much interaction.” Some students reported studying up to nine hours each day because, following Zoom calls, they “had all this work to do after school.” Sporadic scheduling was problematic as some found it hard “remembering the times that the video calls were happening” or “waking up for the early Teams calls.” Communicating through synchronous calls was difficult for some because the teacher did all the talking and students turned off microphones and videos. Some reported simply not attending any synchronous sessions.

Also difficult was the inaccessibility to peers and teachers and some students became demotivated when there was a delay in a teacher response: “It seemed too much effort to ask the question then wait for a reply.” Some students reported feeling uncomfortable asking questions in front of a class on Zoom, through email or in a phone call.

Learning from the experience

Participants particularly valued the flexibility afforded by online teaching and learning and would like this aspect continued back at school. The use of educational technology was seen as enabling a more flexible schooling system, whereby teachers could continue in the future to create video resources, use websites such as Education Perfect to access learning resources, use platforms such as Google Classroom as a repository for learning materials, and communication tools such as Zoom to communicate with students when face-to-face interaction was not possible (for example, if a student was sick). Suggestions included spending less time in class, e.g., four days a week and the fifth self-directed learning (at home or at school), and that teachers continue to use technology to provide resources:

I would love to see lessons that provide us with what we need to know (one or two a week). But after, give us the opportunity to work away at it, that way I feel we have more free time and don't feel trapped in school which does not make it an

enjoyable place for us at all. I believe lockdown gave us the chance to experience something new that we had no idea worked.

I definitely felt a lot happier with how the work was given to us rather than feeling like I'm wasting my time sitting in class every day and having no motivation to come to school.

It was clear participants valued control over the time and pace at which they learned. A key theme that emerged was the independence and choice of when they devoted time to their learning, how much time they would allocate to various tasks and when they would have free time. Flexibility in terms of pace and timing were also seen as alleviating stress involved with completing NCEA qualifications. For example:

Being able to choose how long I spend on each topic and being able to get teachers help at any time when I was working on it and being able to plan my day to give more time to things I struggled in and less time for classes I do not need as much time for.

Something that the school could do that would help shape the way learning happens in the future is to give the student the independence to work at home if doing internals (school-based assessment) this way students will be less distracted by the class's atmosphere.

Give students more choice when it comes to what they do at lunch or morning tea. So, let sensible students, i.e., seniors, go for runs, watch YouTube, relax in general, so that they can destress between classes.

Only slightly over half (51%) of participants reported learning less while studying remotely at home with 21% saying they learnt more and 28% thinking they learnt about the same. The majority (73%) said they spent less time on schoolwork during the emergency remote teaching than they did at school, but some reported this was a more efficient use of their time:

I could choose the subject I wanted to focus on and get the assessment done in a few days. For example, I needed to do a chemistry report and I was able to put my full focus on that. This allowed me to get ahead in ALL of my subjects and I was more efficient with my time.

In lockdown we got rid of the all the time we waste at school, like homeroom, taking the roll etc. I think we should think about changing how school looks, maybe do some classes online and some in school.

Interestingly, only a minority of participants (10%) preferred working at home, the place of choice for most was still school, but with more control over how their time was used or a combination of home and school. Those who wanted to stay home for all of their learning commented that they found school stressful or that home was more peaceful, classes had too many distractions, there were disruptive students and they experienced bullying. A further interesting finding is that only 1% of participants described technology

access as inadequate, such as slow Wi-Fi or inaccessible applications. The predominant comments in regard to learning through technology were the effective or ineffective use of it.

Discussion

Teaching and learning during the crisis

This research has shown that students did learn remotely during the school closures of Covid-19, but some strategies and pedagogies were more effective than others, with those that were effective aligning with previous distance and online education literature on the importance of motivation (e.g., Hartnett, 2016; Ng, 2019), empathy (Holmberg, 2005), appropriately structured courses that are responsive to students' needs and collaborative activities (Moore, 2019). For distance education to be successful the quality of teaching is paramount (Education Endowment Foundation, 2020) but online learning is not the same as classroom learning and effective pedagogical approaches differ (Moore, 2019).

Students in this research appreciated pedagogies where teaching decisions are informed by their needs, are cognisant of individual situations and provided support for their wellbeing. Supportive pedagogy in this situation aligns with Holmberg's (2005) notion of empathy, Nodding's (1984) 'ethic of care' and Bozkurt et al.'s (2020) suggestion that education provided in a time of crisis should be developed from a "pedagogy of care, affection and empathy" (p. 1).

The critical role of motivation to engage in distance learning has long been recognised (e.g., Hartnett, 2016; Ng, 2019). A lack of motivation was a significant issue for students, but this was juxtaposed with a desire for greater independence as many students enjoyed the flexibility afforded by online teaching and learning. Motivational strategies described by students included teachers providing supportive personal conversations, feedback on their work and having clear expectations which echo Hartnett's (2016) findings. Also motivating were course resources and specific activities which align with the notion of distributed motivation whereby motivation lies not just with the student but also with learning materials, multimedia technologies and learning platforms (Ng, 2019). Independent learning was supported with the provision of resources and activities through well curated learning management systems which provided clear plans, a range of learning activities, and multimedia material which enabled students to meet and evaluate their academic goals.

Less successful for learning were pedagogies that employed content delivery only such as long synchronous teaching sessions where the teacher did most of the talking and students were to listen. This is reminiscent of Bozkurt and Sharma's (2020) claim that the provision of content only is not effective distance teaching and learning. Structural issues such as following the school timetable, or in other cases where online classes clashed created difficulties for learning and motivation which point to the flaws in attempting to replicate synchronous face-to-face teaching for online learning.

Preparing for future crises

One important message from the school closures of Covid-19 is that schools need resilience, but resilience requires preparation. The crisis planning models of Regeher et al. (2016) and Zdziarski (2006) emphasise the preparation phase and Mutch (2020) calls for student voice to be heard in such planning. The findings from this research show that students experienced a range of teaching and learning during the emergency which

support Reimers & Schleicher's (2020) finding that while many New Zealand teachers were prepared for remote teaching, others found this challenging. However, all schools and teachers need a level of preparedness because Covid-19 is still with us, and many other events can lead to ongoing school closures. As Mutch (2015c) claims, no matter the disaster, teaching is expected to continue and teachers are expected to know what to do. New Zealand teachers were given less than three weeks to prepare for emergency remote teaching with the expectation that they would be able to do this, but findings from this study show levels of preparedness varied.

Effective use of teaching resources, learning management systems and digital devices allowed students to continue learning during school closures of Covid-19 which aligns with previous studies by researchers such as Day (2015), Regehr et al. (2016), Camille et al. (2008), and SchWeber (2008) who all claim that online technology became a tool for students to continue their education during a crisis period. This indicates that schools need policies that enable the development of, and access to, learning management systems and teacher knowledge to use these effectively. Students also need adequate knowledge, Internet access and devices to access learning. Research carried out by the Greater Christchurch Schools' Network (GCSN) (2020) that focused on school responses to remote teaching in Canterbury during Covid-19 found that "students who had a device prior to lockdown had a higher average level of learning progression than those who did not have a device but were provided with one" (p. 81), which reinforces the need for policies that prioritise dedicated digital devices for students.

Despite at least 11 years of schooling, 40% of participants declared lacking motivation to study without the presence of either a teacher or peers. The New Zealand Curriculum (Ministry of Education, 2007) declares in its vision that schools will prepare students "who will be confident, connected, actively involved, and lifelong learners" (p. 8). In addition, the curriculum encourages all students to reflect on their own learning processes and to learn how to learn, and that schools should develop in students the key competency of "managing self" (p. 12). This implies teachers have to teach students to be independent learners, use motivational strategies and support independent learning because findings from this research have shown that many participants lacked these skills. While many participants cited a lack of motivation to complete schoolwork during the school closures, this research has shown that the effective pedagogical use of digital technologies and learning management systems did encourage students to be more independent learners and allowed teaching to meet individual needs. Again, emphasising the urgent need for school policies that prioritise digital age learning.

Reinventing schooling

It has been long argued that changes in schooling are needed because current education structures and practices do not fully support the learning needs of students in the digital age (Bolstad et al., 2012), but New Zealand secondary schools have changed slowly in the last 30 years. Disruptive events which close schools, such as major earthquakes, can open the possibility for change, but educators must avoid the notions of "going back" and "getting back to normal" (Bolstad et al., 2012). In 2012, following a major earthquake, a discussion paper called for change in the way education was delivered in Christchurch with a key recommendation being embracing a "technologically-enabled view of the future" (Shaking Up Christchurch Education Network, 2011, p. 1), but recent research found that about 22% of Christchurch students were without a device during Covid-19

lockdown and about 15% appeared not to have an Internet connection, indicating that earlier visions for change had not occurred (GCSN, 2020).

The students in this research gave clear indications of changes they would like to see in a post Covid-19 model of schooling. As one declared, “I believe lockdown gave us the chance to experience something new that we had no idea worked.” Participants appreciated the control they had over the timing of when and what they studied, echoing a principle of 21st century learning discussed by Bolstad et al. (2012). The principle of personalising learning refers to building schooling and education around the learner rather than “the learner being required to fit with the system” (Bolstad et al., p. 3). Greater and more effective use of educational technology could enable a more flexible, student-centred schooling system, whereby teachers create video resources, use education specific learning technology and online resources and platforms such as Google Classroom as learning management systems. Communication tools such as Zoom could be used to communicate with students when face-to-face interaction was not possible or when online interaction is just more convenient.

In addition, participants in this research suggested changes to schooling timetables. These suggestions included spending less time in class, e.g., four days a week and the fifth self-directed learning (at home or at school). They also wanted more flexibility over how their time in school was used in terms of having the opportunity to work on subjects, topics and internal assessments of their choosing and timings which suited them. Allowing senior secondary students more agency over their schooling should lead to more self-directed learning, but policies, practices and structures need to change to allow that to happen. This research found that 40% of the participants lacked motivation to study when not in the presence of a teacher or peers, therefore schools need to consider how to reposition learners so that they enact agency, and this may take time to change (Education Review Office, 2018). Teachers need to deliberately allow student input rather than being the key decision-makers (Davis, 2019).

Conclusion

Mutch’s (2020) crisis planning model ends with renewal, but renewal requires planning otherwise it can quickly revert to ‘back to normal.’ We propose a resilience planning model – not just for crises, but for the change that is required in the digital age. The use of educational technology has been an effective means of continuing education during crises, but the use of educational technology needs to be familiar and embedded in policies and practices prior to a crisis. Therefore, a resilience model which includes senior secondary schools needs effective use of educational technology at its core. Drawing on New Zealand senior students’ experiences during Covid-19, a resilience model will include policies that prepare students and teachers for future emergency remote learning in times of crises.

Firstly, each senior secondary student needs access to a dedicated device and the Internet in order to access online learning, and they need to know how to learn independently when teachers are not on hand. During Covid-19, students who lacked access were provided with devices and Internet connections, but after schools re-opened most of these had to be returned (GCSN, 2020). Currently, digital technologies are not centrally funded but the ad hoc integration and usage of digital technologies in New Zealand schools that has prevailed so far (Starkey et al., 2017) needs to be addressed, and it is time to consider national policies that mandate and finance digital technologies for school age children.

Secondly, schools should consider policies, practices and structures that enable senior students to develop agency and resilience in their learning. The students in this study found managing their time and motivation difficult when not in the physical presence of a teacher or their peers, however, they also requested greater flexibility in their learning.

Thirdly, there is a need to support the development of teachers' professional knowledge and skill in the use of learning management systems and online teaching practices that are underpinned with theories of motivation and a pedagogy of care. Educators such as Bozkurt et al. (2020) and Darling-Hammond and Hyler (2020) have called for all educators to be familiar with, and have some training in, online pedagogies, and for New Zealand teachers this would need to align with contextual priorities including the New Zealand Curriculum (Ministry of Education, 2007), Te Marautanga o Aotearoa (Ministry of Education, 2017), Tātaiako (Ministry of Education & Education Council, n.d.) and Tapasā (Ministry of Education, 2018).

There are international frameworks that provide guidelines for professional digital competencies for teachers, for example: ISTE Standards for Educators; Australia's National Professional Standards for Teachers; UNESCO's ICT Competency Standards for Teachers; the European Unions' DigiCompEdu; the Norwegian Professional Digital Competence Framework (Kelentrić et al., 2017); and a Teacher Digital Competence (Falloon, 2020), but none have official status in New Zealand. In fact, the current standards for the New Zealand teaching profession (Teaching Council, 2017) make no mention that digital competence is a requirement for effective teaching practice in New Zealand. An urgent policy initiative is to develop a professional digital competence framework that can be implemented in initial and in-service teacher education, and to ensure a level of digital competence which includes online pedagogies is a requirement for teacher certification.

Education systems need policies for planning and training for more online and blended learning in the future, not just for disasters and crises but to prepare students for a future of living in a digital age. Plans need to include that: teachers receive professional development in online pedagogies which emphasise the importance of motivation and a pedagogy of care over the delivery of content; schools have effective online learning management systems and that teachers and students know how to use these; and that students have ongoing access to the necessary technology so they are familiar with learning this way.

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Appendix 1

Questionnaire:

1. Year level
2. School name
3. Number of timetabled virtual classes you were expected to attend each week [0, 1-6, 7-12, 13-18 >18]
4. How much time did you spend each day engaged in learning at home? [< 1 hour, 1to 2 hours, 2 to 3 hours, 3-4 hours, 4 hours, other.]
5. Is this more or less time than you would normally spend engaged in learning at school? [more, about the same, less]

6. Did you think you learnt more when studying at home than studying at school?
[more, about the same, less]
7. What are three things your teachers did that helped you to successfully learn at home?
8. What was your favourite virtual learning activity? Describe the activity and why you enjoyed it.
9. What was your least favourite virtual learning activity? Describe the activity and why you did not enjoy it.
10. How helpful was online collaboration with your peers for your learning?
[Better than in class collaboration/ about the same/ I learn more when collaborating in class]. (explain why for those answering better or worse)

Thinking about the subject that you enjoyed most when learning at home:

11. Name the subject:
12. How much choice did you have in how you studied?
13. Is the level of choice similar to what you have when learning at school?
[more/similar/less]
14. Did your teacher give everyone in the class the same learning activities?
[everyone did the same / we could choose between set activities / we were given different activities/ we were given the same activity but could choose what we studied within that task].
15. What has been the hardest part about learning at home?
16. What is something you are doing now as a virtual learner that you hope you will be able to do when you are back at school?
17. Please add any other comments you would like to make that could help shape how learning happens in the future at your school.

Dr Anne Yates taught in high schools prior to becoming a tertiary educator and researcher. Anne has long-standing interest and expertise in teaching and researching open, distance and online learning. Her current research focuses on digital technologies in education and the impact of initial teacher education on student teacher digital readiness for the classroom.

Email: anne.yates@vuw.ac.nz

ORCID: <https://orcid.org/0000-0003-1814-9797>

Dr Louise Starkey gained experience as a classroom teacher, curriculum leader and senior manager in a range of New Zealand secondary schools prior to following a passion to research education in a digital age. She researches in complexity theory, educational policy, and practice associated with teaching and learning in the digital age.

Email: louise.starkey@vuw.ac.nz

ORCID: <https://orcid.org/0000-0002-8607-366X>