A Retrospective of Teaching, Technology, and Teacher Education During the COVID-19 Pandemic

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Where there is no guidance the people fall,
But in abundance of counselors there is victory.
- Proverbs 11:14 (NASB)

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Teachers' Digital Pedagogies During the Emergency Remote Schooling Period in Australia

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This paper examines digital teaching approaches adopted by Australian teachers in an emergency remote schooling period occurring during the pandemic. We examine these practices using a digital pedagogical framework presented in our 2020 chapter that highlights the features of personalisation, authenticity and collaboration. Data were collected from four case schools that were selected because of their reputation for effective management of student learning and wellbeing during this remote teaching period. Findings reveal that despite minimal preparation time, teacher participants from the case schools found ways of designing and implementing digital learning tasks that leveraged student agency and collaboration, and where possible, elements of authentic learning. Teachers' confidence levels with new digital pedagogies improved during this period, and many practices continued upon return to normal schooling.

HISTORICAL REVIEW

In our original 2020 paper (Kearney et al., 2020a) we anticipated the various resources and digital pedagogical framework (Kearney et al., 2019) we had created prior to the pandemic would assist teachers in designing digital learning activities to meet some of the challenges posed by COVID-19, such as school lock-downs and the shift to more remote learning with less direct teacher intervention and support. The framework is underpinned by a sociocultural perspective (Wertsch, 1991), highlighting features of personalisation, authenticity and collaboration (hence, the acronym iPAC) as distinctive pedagogical approaches associated with teaching and learning with mobile devices (see www.ipacmobilepedagogy.com for a detailed description). We refer to these approaches as digital pedagogies, and to learning activities mediated by the use of technologies (typically mobile devices such as laptops, tablet computers and smartphones), as digital learning tasks. In our original 2020 paper, we explored how teachers might address some of the challenges posed by enforced remote teaching, such as less scheduled timetabling, restricted access to physical and outdoor spaces, and the difficulties associated with collaborative patterns of learning, such as group work and peer-to-peer social interactions. In particular, we illustrated how digital pedagogies might be used to alleviate the problems associated with isolation and solitary learning, by linking students' learning with their peers and with experts outside their normal networks. We postulated that the pandemic and school closures might offer teachers an opportunity to reconsider digital pedagogies by focusing more on activities students could undertake either in the home, with 'experts' such as grandparents, or in other out-of-school environments where the promise of mobile learning had not been fully exploited (Kearney et al., 2020b). We offered a variety of validated tools and evaluation instruments (Kearney et al., 2020a) to support teachers in designing and evaluating the efficacy of these new designs and strategies.

Unfortunately, the various school lockdowns and disruptions to learning in Australia and around the world were more severe and far-reaching than we had anticipated. In the initial stages of this period, teachers and schools were driven to find short term solutions that did not always encourage more considered thinking about the role of digital technolo-

gies in ways we describe above. Emergency remote schooling appears to have been dominated by the use of technologies such as video-conferencing (e.g. Zoom) that allowed replication of non-digital pedagogies (e.g., see Ewing et al., 2021), rather than reconsideration of digital pedagogies. This is not surprising given the disruptive nature of the lockdowns and minimal preparation time granted to teachers. However, there were some interesting examples of effective digital approaches tailored to the pandemic context. Consequently, we seek to answer the following research question arising from Kearney et al. (2020a): *What effective digital pedagogies were adopted during the emergency remote schooling period of the pandemic?* We address this question by drawing on data from four case studies conducted during the pandemic.

PROCESS AND METHODS

Over 2020-2021, the authors were sponsored to conduct a qualitative study to identify the digital practices of four schools identified as being effective in supporting student learning and wellbeing during the emergency remote schooling period. The study occurred in New South Wales (NSW), Australia and focused on the nation-wide lockdown periods. This chapter considers the data from these case studies to address the research question.

Participants

The research sponsors were the research office of a NSW education sector. They selected schools that effectively managed the emergency remote period in vastly different ways. They comprised an all-girls K-12 metropolitan school (Brightwater), a religious K-12 metropolitan school (Manlala), a country town primary school (K-6) with an emphasis on learning in the natural environment (Fairmeadows), and a regional school catering to students with special needs and young parents (St Theresa's). Participants in the study were 21 volunteer primary and secondary teachers, and eight school leaders from these schools. Secondary teachers were from a range of subject areas. The remaining participants were 63 school students grouped according to their year of schooling, from Year 1 to Year 11, plus a group of young parents.

Methods

An interpretive approach was used, aligning with a qualitative paradigm. Methods comprised 30-minute semi-structured interviews with teacher participants in groups of two to four, and with principals and executive staff members. Participants were interviewed about their experiences, strategies and students' experiences. Eight 30-minute student focus groups were also conducted, each with five to ten students from participating teachers' classes. Students were asked about their experiences during the emergency remote learning period, what they had enjoyed, what was found to be difficult and how they had interacted with peers and teachers.

Analysis

For this chapter, the data for each school were categorised using the iPAC features outlined above and in the previous chapter (Kearney et al., 2020a). The data were initially scanned for any themes related to iPAC features (that is, to personalisation (P), authenticity (A) and collaboration (C)), and where data mentioned these dimensions, they were placed into the appropriate category. Two of the authors collaboratively did the initial categorisation and this was checked by the third author to ensure inter-researcher consensus. The three categories (PAC) were then examined for common themes arising in relation to the three categories. These formed the basis of the results section.

RESULTS

The remote teaching period highlighted the need for case study teachers to develop a broad and inclusive set of digital pedagogies to support student learning. Their approaches featured aspects of the three major dimensions of iPAC,

personalisation and collaboration, and to a lesser degree, authenticity. They catered for the needs and circumstances of all students, including those with additional needs, and those with home technology access or connectivity limitations.

The results below are organised according to the three iPAC dimensions. Reported themes represent strong common patterns emerging from the qualitative data analysis. Examples are shared as illustrations of these themes.

Personalisation

Encouraging student agency was a prominent part of case school teachers' digital approaches. Schools minimized whole-class, 'live' online teaching, and instead focused on tasks designed to leverage student autonomy and more independent work. Students enjoyed the extra control and choice involved in these digital learning activities. Parents appreciated the flexibility afforded by these tasks, as they strove to balance their own work with their new roles as facilitators of their children's remote learning.

Young children at Brightwater school enjoyed the autonomy of documenting their own learning. Students used their devices to capture and share photos or work samples of their choice, and then reflect on their learning experiences. K-6 teachers at this school are subsequently using digital portfolios with students post-lockdown, and according to an executive staff member, they are more proficient at giving personalised feedback in the online spaces associated with these tasks: "Teachers learnt to use targeted feedback effectively. In terms of professional growth, I saw more progress in four weeks of online learning than exploring that topic [of feedback] at other times" (Brightwater executive staff member interview).

Teachers at St Theresa's school sought a balance of guided and self-paced activities. They worked on building their students' capacity to learn more independently, as these students with special needs were accustomed to having more structured support. Like the Brightwater school students, St Theresa students would choose, and share photos of work samples to provide evidence of their learning. Teachers were able to adjust the task for each student's differing circumstances, and felt that many students benefited from this more self-controlled environment: "Students felt empowered that they could take control of their learning" (teacher interview).

Authenticity

Case school teacher participants strove to design and implement digital learning tasks that exploited relevant contexts, and supported realistic and meaningful processes and use of tools. Teachers at all schools asked students to use real-life materials from their homes in their digital learning task designs. Science teachers, for example, asked students to make use of apps for capturing evidence from home experiments, analysing data, and reporting through photos and videos. For an experiment on mixtures and solubility, a Science teacher at Brightwater required students to use their devices to take photos of their setups and to check their progress and understanding of learning. The students also used their devices to film and share their experiments. Teachers were able to watch their students' videos and then analyse their explanations of phenomena. This process provided opportunities for formative assessment.

Fairmeadows teachers designed activities suitable for learning in permitted locations during school lockdowns, such as the backyard, nearby parks and the beach. Students would use their digital devices to record photos of experiments and later share these in video-conferenced classes. A Year 1 teacher described an activity where students were exploring patterns in nature, "sorting and classifying leaves by shape and colour, nature mandalas, threading patterns, using natural resources" (interview). The teacher emphasised the importance of the outdoor settings for students, "allowing them to go and connect with things in their backyard" (interview).

Teachers at Fairmeadows were challenged by their inability to implement excursions and field trips—a core part of their normal curriculum design. They found simulated solutions, such as digital incursions. In these activities, students used iPads to access interactive sites such as the city zoo and museums for research activities in small groups. In this way, activities remained aligned with the school's emphasis on outdoor education: "I'm proud of the way that we designed learning that was still authentic to our context, that 'looked and felt' like us" (Fairmeadows principal interview). These incursions are now used post-lockdown to supplement first-hand, face-to-face experiences.

Collaboration

Teachers at all four case schools were conscious of the benefits of peer collaboration and promoted digital practices to leverage learning conversations and group work. Teachers emphasised the provision of opportunities for students to use their devices to connect and talk with each other, often multi-modally, both to enhance collaborative learning, and also to combat isolation: "If you can facilitate group work where students Zoom each other and then share ideas, that's actually really valuable and much better for their wellbeing" (Brightwater teacher interview).

Manlala teachers used Microsoft Teams to mediate peer learning conversations as part of online peer debates in senior Social Science subjects, and for peers to assist each other in Mathematics. One teacher described a group facility in his Year 12 Mathematics class: "I have a homework help channel, and this is where the students will ask a question and they'll reply to one another, and help each other through anything that they're working through, or pose any questions they have."

Students also used their digital devices to engage in collaborative processes that featured co-creation. For instance, the Year 8 Science teachers at Brightwater used cloud-based software such as Padlet and Google Documents to allow students to brainstorm, share and record ideas in groups.

IMPLICATIONS

The results indicate that the emergency remote schooling period was challenging for teachers and students. However, they also suggest that some effective practices were developed and implemented, and many of these approaches have been continued as teachers resume post-lockdown schooling. Further, teachers appeared to become more open to using digital technologies in different ways during the lockdown period, thus broadening their skills and confidence in digital pedagogies.

The case schools addressed well-documented challenges arising from the emergency remote teaching period, including teachers feeling under-prepared for pivoting to remote teaching (Trust & Whalen, 2021); students adapting to new ways of learning (Gore et al., 2020); and teachers finding and adjusting to suitable digital pedagogies (Ewing et al., 2021). The results shared in this chapter offer an overview of such digital practices through the lens of our iPAC framework. We have also recently reported on separate studies that used our validated iPAC survey instrument—mentioned in our 2020 paper (Kearney et al., 2020a)—to further explore school teachers' digital pedagogies, including approaches supporting students with special needs (Kearney et al., 2022). We recommend further research that elicits 'student voice' to supplement teachers' perspectives, for example, using our student iPAC surveys (Burke et al., 2021).

The case schools invested considerable time supporting students' families during the school lockdown period. This initiative was in recognition of the key but unfamiliar role that many parents and carers were adopting as facilitators of their children's learning, particularly in primary schools. The extra support was in acknowledgment that family wellbeing was at risk due to the isolation, particularly for parents trying to balance their own work and family commitments. As mentioned, part of the rationale for enhanced student agency in digital learning task designs was to give parents flexibility with facilitating their child's learning. Indeed, parents and carers became increasingly appreciative of teachers' professional expertise, with the digital learning environment providing "a little window for them to see inside what a classroom might be like" (Brightwater teacher, interview). Therefore, in preparation for future lockdowns, it is valuable for parents to be included in school discussions of digital learning initiatives, including opportunities to develop digital skills associated with the use of school-endorsed apps and devices. This will enable a more seamless pivot to future remote teaching periods.

In terms of digital pedagogical innovation—also mentioned in our previous chapter (Kearney et al., 2020a)— case study teachers were clearly implementing different practices from those they had previously adopted in their pre-COVID classrooms. However, there were few examples that aligned with our digital innovation principles (Burden et al., 2019), with the exception of intergenerational learning (one of the principles) that was evident between students and their parents across the four cases, as discussed above.

The study shows that despite the difficulties of adjusting to new ways of teaching during the remote schooling period, effective digital pedagogies were implemented by the case school teachers. Such digital practices supporting students' agency, co-creation and relevant, contextualised learning need to be rehearsed by pre-service teachers in a range of physical and online learning spaces in preparation for their future teaching.

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