

Distance Education Literature Review

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Executive summary

Advances in technology over recent decades have facilitated the expansion of distance education to meet the needs of new and increasingly complex student cohorts. With these changes there has been an increasing focus on consideration of remote teaching methods, effective student engagement support, and the capacity of distance education to support system-wide educational delivery.

Student engagement is a key focus of the research due to the specific educational needs of the diverse distance education cohort (Bloomfield et al. 2022; Ronksley-Pavia and Neumann 2022) and the higher demands for self-regulation when students are learning remotely (Borup et al. 2020; Harris et al. 2022). Studies indicate that student engagement in remote learning is enhanced when teachers present a varied, interactive program that makes full use of features of learning management systems to engage with students across a range of cognitive functions (Martin and Borup 2022; Louwrens and Hartnett 2015; OECD 2023; AITSL 2023), facilitates meaningful peer-peer and peer-teacher interactions (Borup et al. 2014; Borup et al. 2020; Ames et al. 2021), and leverages the support of students' broader community (Bloomfield et al. 2022; Bond and Bergdahl 2023). For students enrolled in distance education, the more extensive supervision requirements for parents and carers is well documented, particularly for younger children and students with disability (Downes et al. 2020; Haas et al. 2022). Research also indicates that greater engagement of parents and carers is associated with improved student engagement and learning outcomes (Ricker et al. 2021; Curtis and Werth 2015).

Despite the specific technological and pedagogical skills and knowledge required to deliver effective distance education programs (Grammens et al. 2022; Ronksley-Pavia and Neumann 2022), several studies have indicated that distance education teachers report receiving little specific training on remote learning techniques (Rehn et al. 2018; Ames et al. 2021). Much recent research into distance education pedagogy focuses on videoconferencing delivery. Studies show the rate at which teachers demonstrate the immediacy behaviours (such as using student names, providing immediate feedback, and use of body language) known to maintain student engagement is largely associated with years of teacher experience rather than self-reported skill and knowledge related to videoconferencing technology (Rehn et al. 2016; Ames et al. 2021; Slaughter et al. 2019).

While analysis of the use of emerging technologies is a common theme of recent distance education studies, researchers have also noted that new technologies are often enthusiastically implemented prior to the demonstration of robust evidence of effectiveness (Fryer et al. 2023, AITSL 2023) and before the establishment of appropriate oversight and governance frameworks to ensure safe and equitable access (see Loble and Hawcroft 2022 specifically regarding artificial intelligence). Authors have also emphasised that access to computer equipment and reliable broadband internet is required before the benefits of new technologies can be realised (AITSL 2024; Cowden et al. 2020), particularly for the many distance education students who face barriers to this access (Wade et al. 2022).

Many teachers and students engaged in remote learning on a regular basis for the first time during temporary learning-from-home provisions during the COVID-19 pandemic. Studies of effective remote learning practices during this period can be seen to validate many of the core themes of the distance education research, including the significance of establishing teacher presence, maintaining student engagement, developing student self-regulation, supporting peer collaboration, and the benefits of prioritising quality rather than quantity of online time (AITSL 2020; Cowden et al. 2020; Wade et al. 2022; Bond et al. 2021).

In addition to emergency learning from home provisions, systems have also increasingly recognised the ongoing capacity of distance learning to supplement conventional school delivery as technological capacity increases. Building on existing distance education resources, systems have the capacity to accommodate accelerated or extended student progression, broaden and supplement in-person curriculum delivery, support students with additional learning needs, and share resources between school locations (QCAA 2017; Radcliffe 2023; Slaughter et al. 2019).

Introduction

Distance education was established in Australia during the late nineteenth century to deliver schooling to a small number of geographically isolated students. Despite remaining a minority provision today, distance education continues to play an important role in ensuring educational access for students facing a variety of barriers to accessing school in person. Advances in technology have seen distance education expand to support a range of other learning needs, such as providing continuity to students with acute medical conditions, elite sporting or other professional commitments, and to those travelling for extended periods. Distance education is also increasingly being used to extend curriculum access to students attending in-person schooling where a broad range of subjects or extension opportunities are otherwise unavailable.

This literature review provides a broad overview of recent research into distance education, primarily focusing upon Australian, Canadian, New Zealand and similar K-12 educational contexts. This review includes international peer-reviewed research and public sector reporting on distance education, covering the topics of (a) distance learning pedagogies, (b) student engagement and wellbeing, (c) learning technology, and (d) pedagogical leadership and professional development. The review has included studies specifically relating to distance education and research into the educational methods and technologies commonly, but not exclusively, used in distance education delivery. Where possible, studies on post-secondary education have been excluded, noting that meta-analyses and systematic reviews into remote teaching methods often include studies relating to all education levels.

There are some limitations to the literature. Distance education uses a variety of delivery methods and caters to a relatively small number of students from a wide range of demographic backgrounds. These characteristics can complicate the assessment of teaching practice and outcomes, potentially limiting the applicability of findings outside of the research context. Other parts of the literature are more extensive, such as the considerable body of research on the technologies used to facilitate remote learning. Improvements in digital learning technologies have narrowed the gap in educational experience between distance education students and those in conventional classrooms. Indeed, emergency provisions during COVID-19 lockdowns saw many students learning in circumstances resembling distance education.

This review highlights research findings that are relevant to distance education on a system-wide level, identifying key issues that policy makers should consider when considering the role of distance education within systems. These issues include equitable technology access, adequate home supervision, the need for appropriate professional development in remote teaching methods, and the comparatively high cost of delivery.

Definitions used in this review

The Australian Education Act (2013) defines distance education as a specific type of education provision that is categorically distinct from homeschooling. Despite this, the terms 'distance education' and 'homeschooling' are often conflated, even in the literature.

Throughout the literature more generally, there is little consensus on the definitions of many basic terms. There are many overlapping and variously defined terms used for different methods of remote educational delivery across different schooling settings. One systematic review of the literature identified 46 different definitions of the term 'online learning' and found that often research does not delineate between programs delivered entirely online and those delivered partially in-person, or between programs with different proportions of live online delivery and self-paced content (Singh and Thurman 2019).

The following definitions and key terms are used throughout this review:

Distance education refers to an education provision that facilitates flexible learning for students unable to attend an in-person school due to their circumstances. In NSW, distance education is available to students who are geographically isolated, unable to access appropriate curriculum, or otherwise unable to attend their local school (NSW Department of Education 2024).

Distance education student refers both to students enrolled directly at a distance education provider full-time and to students undertaking a single-course enrolment to access curriculum unavailable to them at the school they are otherwise enrolled. *The Australian Education Act 2013* (Pt 1, Div 2) defines a distance education student broadly as a person who resides in a specific State or Territory, is enrolled at a school which receives funding from that State or Territory for students enrolled at the school who receive distance education (however described) from the school, and is not an approved home education student.

Remote learning refers to educational programs undertaken at a distance from school campuses. This is a broad term that is used to refer to self-directed learning activities delivered online and temporary learning-from-home provisions, in addition to distance education.

Online learning/education refers to educational content that is delivered via a computer or other digital device. This includes a wide range of programs that can be undertaken independently or collaboratively and may be completed remotely or as part of in-person learning in the classroom.

Home schooling/home education refers to education programs undertaken by children under family supervision without enrolment in an accredited school. In NSW, parents/guardians seeking to take responsibility for compulsory schooling of their children are required to obtain registration with the NSW Education Standards Authority (NESA) or seek exemption from registration via objection on conscientiously held religious grounds (NESA 2021). Unlike distance education students, home schooling students are not enrolled at a registered public or non-government school.

Asynchronous instruction refers to learning activities which students complete independently to teacher delivery. This can include self-directed learning, viewing recorded content, or use of interactive technology, among other activities.

Synchronous instruction refers to learning activities where students and teachers are interacting in real time.

Blended/hybrid learning refers to instructional design that combines remote and in-person educational methods.

Flexible learning refers to teacher-directed options where students may choose when and where they learn, adjusting pace, content, and assessment to suit their needs.

Learning Management System (LMS) refers to the digital platform used to organise and deliver course content, host communication between course participants, and track student progress in online learning.

Virtual refers to experiences occurring in digital or online environments.

Distance education in Australia

Distance education in Australia has evolved over the course of nearly 160 years. Early forms of distance education focused on delivering mandatory schooling to geographically isolated students, such as the half-time and travelling schools established in New South Wales

following the *Public Schools Act* of 1866 (Buckingham 2017; Freeman 1993), the use of learning by correspondence to meet state government mandates for universal education provision in the 1910s and 1920s (Radcliffe 2023; Freeman 1993), and the later use of the Royal Flying Doctor Service's shortwave radio network to deliver education to children in remote areas in the 1950s (Evans and Jakupc 2023). However, over the past century, distance education has expanded to support a wider range of system and student needs (Buckingham 2017; Knipe 2023).

Advances in technology have allowed distance education to more closely resemble in-person school environments, transforming it from a conduit of curriculum content to a medium used to facilitate meaningful interactions between students and teachers (Radcliffe 2023; QCAA 2017). The urbanisation of distance education has seen its appeal extend beyond the geographically isolated (Radcliffe 2023). One parent survey in Queensland found the factors motivating distance education enrolment across all years included bullying (36% of respondents), a desire to improve academic progress (28%), and anxiety and depression (14%) (Radcliffe 2023).

Yet despite technological advances, the expansion of distance education in Australia has been slow and uneven, with little consistency in provision, reporting or accessibility across jurisdictions (Buckingham 2017). A broader adoption of technology has the potential to expand distance education in Australia beyond an equity provision for students unable to attend school in person (Buckingham 2017). Although access has not been widely extended, public awareness of the capacity of distance education to support system-wide delivery has increased considerably following periods of widespread remote learning during the COVID-19 pandemic (Knipe 2023).

Student engagement

Student engagement is a central focus for much of the research into distance education (for example Louwrens and Hartnett 2015; Bond and Bergdahl 2023). This is likely due to the distinct social and behavioural opportunities and challenges presented in delivering education to students outside of a conventional classroom setting (refer to Radcliffe 2023; Mills and Macgregor 2016).

Distance education can create opportunities for student engagement

Distance education is often used as a strategy to maintain the engagement of at-risk students. This can include those with disability or health conditions, gifted and high potential students, those struggling to meet academic benchmarks, children of itinerant families, students who are parents, students experiencing homelessness and those in out-of-home care (Curtis and Worth 2015; Mills and Macgregor 2016). One opt-in online parent survey found a large proportion of students in 3 Queensland distance schools were enrolled due to bullying or mental health concerns, with most parents reporting that the students had demonstrated good, high, or very high levels of student engagement since enrolling (Radcliffe 2023). Contrary to concerns about the lack of social opportunities for distance education students, survey respondents indicated that increased confidence and communication skills were one of the benefits of distance education, with a considerable

majority (95%) of families stating they had seen no academic or social decline in their children since leaving in-person schooling (Radcliffe 2023).

Teaching and learning strategies to promote distance education student engagement

While distance education teachers are able to deploy the same evidence-based explicit teaching strategies as used by classroom teachers, distance education students can face specific challenges in maintaining engagement with curriculum content and class activities. This can be due to higher demands for self-regulation (Borup et al. 2020; Harris et al. 2022) and the additional learning and support needs of this diverse cohort (Bloomfield et al. 2022; Ronksley-Pavia and Neumann 2022). Distance education teachers also face specific challenges in monitoring how students receive course content and participate in class activities, as physical separation limits the direct observation of student behaviour (Harris et al. 2022).

Throughout the literature, a variety of different approaches have been adopted to identify and model the various ways students think, feel and behave when engaging with course material (Martin and Borup 2022). Many approaches broadly align with three main categories of student engagement (Martin and Borup 2022; Louwrens and Hartnett 2015; Harris et al. 2022):

- **Cognitive engagement** - intellectual participation in learning
- **Affective engagement** - emotional relationship with the content and learning activities
- **Behavioural engagement** - participation in course activities.

Some research distinguishes an additional fourth category of student engagement (Bond and Bergdahl 2023):

- **Social engagement** - interaction with teachers, peers and the learning environment.

Models of student engagement have enabled researchers to assess how different learning strategies in course design can support participation in class activities and enhance student outcomes. Louwrens and Hartnett (2015) examined the effectiveness of teaching and learning activities used in an integrated studies program at New Zealand's state distance education school, *Te Aho o Te Kura Pounamu* (Te Kura). From analysis of interviews, online participation metrics and analysis of student work on Learning Management System (LMS) forums, Louwrens and Hartnett (2015) concluded that different teaching methods encouraged different dimensions of learner engagement. For example (Louwrens and Hartnett 2015):

- **cognitive and affective engagement** was encouraged by students working collaboratively and providing feedback on each other's work
- **affective engagement** was improved through relationships between students and between teachers and students
- **behavioural engagement** was enhanced through activities conducted outside the school's LMS (with teachers suggesting this was due to students feeling a greater sense of ownership over their work)

- **all 3 types of engagement** were associated with activities that students found interesting, relevant and/or enjoyable.

Qualitative studies provide descriptive accounts of the strategies used by distance education teachers to enhance student engagement. Harris et al. (2022) interviewed teachers from an early-childhood to year-12 distance education school in Queensland. These interviews revealed 6 categories of engagement strategies (Harris et al. 2022):

1. relationship building
2. classroom differentiation
3. use of technological tools
4. making content fun and relevant
5. drawing on school-wide pedagogical frameworks
6. encouraging student self-regulation.

Teachers emphasised the importance of tailoring these strategies as appropriate for different student groups and suggested that maintaining visibility of student engagement could be particularly challenging in the distance education context, particularly for older students who may require more time for uninterrupted work (Harris et al. 2022).

The role of community support in promoting distance education student engagement

Establishing and maintaining communities of support for distance education students can be vital for their ongoing engagement. The Academic Communities of Engagement framework (Borup et al. 2014, Borup et al. 2020) identifies two communities that influence student engagement. The first is the course community, which is formed by the school, teacher and student cohort. The second is the personal community, consisting of family and local support (Borup et al. 2020). Because distance education requires students to exercise more personal autonomy and self-regulation, the framework emphasises the important role of personal communities in supporting behavioural engagement, recommending that schools clearly articulate their expectations of students' families (Borup et al. 2020).

Teachers with an awareness of the significance of these communities can employ different learning strategies according to the support networks available to their students. Drawing upon Borup et al.'s (2014) Academic Communities of Engagement framework, Ames et al. (2021) examined how two focus groups of distance education teachers from Queensland used technology to support student learning. Ames et al. (2021) found that facilitating meaningful student/peer and student/teacher interactions was a priority in implementing technology in their classes, with the teachers interviewed reporting that establishing meaningful learning-focused relationships between students; between students and teachers; and between teachers, students and family members was key to creating educational experiences similar to that experienced by students attending in-person classes.

Community support can enhance student engagement, particularly for those undertaking distance education due to disengagement from in-person school. Bloomfield et al. (2022) observed student learning interactions, analysed submitted work and held focus groups and interviews with staff from an Australian community hub that provided coordinated services to students through a range of government and non-government services. Bloomfield et al. (2022) found many of the additional supports available at the community centre had a

positive impact on engagement with distance learning (described as parts of a 'braided curriculum'), including computers, internet connections, and digital literacy support. The additional community services and wellbeing support provided, such as reproductive health classes, mental health support, driving licence courses and sports and fitness programs also had a positive effect on engagement (Bloomfield et al. 2022).

Researchers have modelled the external influences on distance education student engagement. Bond and Bergdahl (2023) situate engagement and disengagement for each of the 4 student engagement categories within a multi-level model of the student learning environment. Building on Bronfenbrenner's (1979) ecological model of child development, Bond and Bergdahl (2023) define 4 external factors that influence student engagement in remote learning:

- **The microsystem** - comprising of the curriculum, teachers, family and technology immediately impacting the student
- **The mesosystem** - the student's socioeconomic background
- **The exosystem** - comprised of broader social influences such as national curriculum and education policy settings
- **The macrosystem** - cultural, political and economic influences in which the other systems are situated.

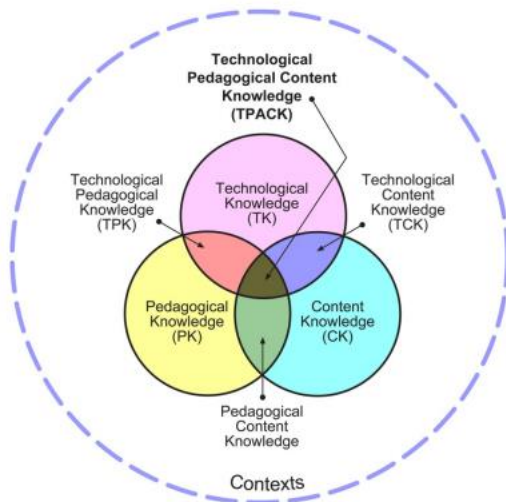
Teaching in distance education environments

Developing alongside communications technology, distance education has come to establish a unique set of teaching and learning practices and patterns of educational delivery, some of which are shared with classroom practice (such as explicit instruction techniques) and some which are specific to teaching at a distance (Ames et al. 2021, Borup et al. 2020, Harris et al. 2022). Yet, despite ongoing improvements in technology, geographic separation continues to present unique challenges for distance education teachers. These challenges include monitoring student participation, maintaining student engagement, and deploying a constrained set of teaching and learning methods (Ames et al. 2021, Borup et al. 2020, Harris et al. 2022). Accordingly, the literature has increasingly focused on how teachers can develop a strong presence over digital platforms to support student engagement.

Furthermore, as videoconferencing becomes an increasingly popular method of synchronous instruction (Rehn et al. 2016, Radcliffe 2023, Knipe 2023), the literature suggests caution for those extending curriculum access across in-person and remote classrooms (Rehn et al. 2016; Slaughter et al. 2019).

Teachers' technological, pedagogical and content knowledge

The Technological Pedagogical Content Knowledge (TPACK) framework is a highly influential model of teacher presence first outlined by Mishra and Koehler (2006; 2009) and later adapted into measurement instrument by Archambault and Crippen (2009). The TPACK framework conceptualises teacher presence as the combined impact of their technological, pedagogical and content knowledge:



Mishra and Koehler's (2009) TPACK framework with illustration of overlapping knowledge components

Research using the TPACK framework suggests technological knowledge alone is not enough for effective teacher presence in remote learning environments (Ames et al. 2021; Rehn et al. 2016; 2018; Slaughter et al. 2019). For example, Rehn et al. (2016) examined secondary school courses delivered in-person and remotely in rural Canada. The analysis looked at teachers' self-reported levels of TPACK competencies (technological, pedagogical and content knowledge), teacher experience and confidence with videoconferencing software, observations of teaching practice, and student-reported ratings of teacher presence (Rehn et al. 2016). The results showed teacher immediacy behaviours (for example, using student names, informal talk, feedback, humour, gestures and relaxed body posture) were correlated with higher perceived teacher presence. Teacher presence was also more closely aligned with teacher experience than with self-reported skills and knowledge (Rehn et al. 2016). Rehn et al. (2016) argue that teachers with more videoconferencing experience had developed better strategies for maintaining a strong connection with students, via trial and error, regardless of how they rated their own technological knowledge.

While TPACK can provide a useful lens to consider effective remote teaching strategies, system settings like infrastructure, staffing and scheduling are also important factors in supporting teacher presence (Slaughter et al. 2019). Indeed, the courses included in Rehn et al. (2016) were not exclusively distance education programs, and the teachers who received the lowest presence scores were simultaneously teaching students in-person and via videoconferencing. To investigate the consequences of simultaneous delivery Slaughter et al. (2019) compared teaching practices in two primary school networks in regional Victoria, one in which the teacher delivered courses exclusively via videoconferencing and one in which the teacher simultaneously taught an in-person class. Consistent with Rehn et al. (2016), the teacher simultaneously delivering content to online and in-person audiences was found to face additional logistical and technological challenges.

As an alternative model to conceptualise teaching via synchronous video, Prestridge et al. (2024) considered the theoretical 'fourth wall' that separates performers from the audience in theatre studies. Prestridge et al. (2024) looked at the strategies used by distance education

teachers to overcome this sense of separation through interviews with 22 teachers from 5 Australian distance education schools. Those strategies were then classified into 3 categories of presence:

- (1) individual presence, where the teacher creates a sense of belonging for the student within the course
- (2) place presence, where the teacher connects the student to the technological environment
- (3) co-presence, where the teacher supports interaction between students.

Prestridge et al. (2024) found that most teachers prioritised strategies to foster individual presence, with some even arguing that it was a necessary precursor to place presence and co-presence. Teachers also described a need for students to develop distinct competencies for learning online, recognising that teachers needed an understanding of how to cultivate self-regulation and other independent learning skills in students (Prestridge et al. 2024).

Distance education teacher professional development

The need for specific training for teachers in remote education has been widely recognised in the literature (Grammens et al. 2022; Ronksley-Pavia and Neumann 2022). Yet, despite technology offering a wide range of possibilities for sequencing and delivering learning activities, much of the research on professional development has focused the skills required for synchronous video delivery (for example, Rehn et al. 2018; Ames et al. 2021; Prestridge et al. 2024).

Distance education teachers are reported throughout the literature as feeling they lack the specific training and professional development needed for their job (Ames et al. 2021; Rehn et al, 2018). Indeed, not a single teacher taking part in a study spanning thirteen remote learning locations in Alberta had received any specific training on how to teach via synchronous videoconferencing (Rehn et al. 2018). Many teachers also reported a sense of isolation and desire to participate in professional networks to improve the specific skills required for remote delivery (Rehn et al. 2018). In a study across primary and secondary distance education campuses in Queensland, teachers expressed the need for more specific professional development relating to technology mediated teaching, despite demonstrating high levels of technological, pedagogical and content knowledge (Ames et al. 2021). Insufficient training, coupled with the additional professional scrutiny of distance education (due to the recording of classes and the observation of parents in the home), is argued to lead teachers towards more conservative pedagogical choices (Ames et al. 2021).

The teaching skills required for videoconferencing differ from those typically identified as required for asynchronous models of instruction (Grammens et al. 2022). A systematic review of the literature identified 5 distinct, yet interrelated teacher roles for synchronous instruction through videoconferencing (Grammens et al. 2022):

- **Instructional** - foundational pedagogy and lesson design
- **Managerial** - class organisation and the establishment of rules and protocols
- **Technical** - technological competence and selecting appropriate digital tools
- **Communicational** - verbal and non-verbal communication across all instructional media

- **Social** - the creation and monitoring safe environments for students to interact with the teacher and each other.

The authors argue that these competencies should be more clearly defined and featured in teacher professional development for those engaged in teaching via videoconferencing (Grammens et al. 2022). While it is worth noting that only 5 out of the 30 studies in the review focused on primary or secondary teaching, this argument resonates with previous calls within the literature for systems to better support research, professional networking and the establishment of specific pedagogical standards for lesson delivery via videoconferencing (Ames et al. 2021; Rehn et al. 2018).

The professional development needs of distance education teachers extend beyond videoconferencing. Specific leadership practices and professional development may be required for distance education teachers serving specific student groups. For example, Ronksley-Pavia and Neumann (2022) identified the key themes required for transformational educational leadership in gifted education specifically applicable to distance education. These included themes such as an understanding of the uniqueness of gifted students and the online environment, and actions to prioritise student engagement.

While the literature reports a shortage of specialised professional development relating to remote teaching and learning practices, it also recognises that experienced distance education teachers are uniquely positioned to act as system leaders within education more broadly. As online learning becoming increasingly adopted as part of in-person curriculum delivery, particularly following the COVID-19 pandemic, researchers have identified the value of distance education teachers' specific knowledge and expertise (Knipe 2023). Distance education teachers have the potential to act as system leaders in sharing quality remote learning practice for student cohorts with a variety of educational needs (Knipe 2023).

Technology and the distance education learning environment

Pedagogy and technology are inextricably linked in the distance education learning environment. Though some schools still offer non-digital programs (such as via mail), research into distance education increasingly focuses on online learning environments (Martin and Borup 2022; Louwrens and Hartnett 2015), with a small but growing body of literature specifically addressing technology in remote K-12 learning rather than post-secondary contexts (Saqlain et al. 2020). Additionally, some researchers have focused on the features of blended learning environments, in which online and in-person delivery are combined (Yu et al. 2023). The increased use and analysis of digital technologies across all educational settings offers some insight into the effectiveness of educational technology when considering learning design for distance education.

Recent literature reviews from the Australian Institute for Teaching and School Leadership (AITSL) have identified several recommendations for how educational technology can be used to improve educational outcomes:

- Using online platforms to share high-quality teaching resources (AITSL 2023)

- Making use of technological efficiencies to prioritise teacher time for quality teaching and learning activities (AITSL 2023; ATISL 2024)
- Facilitating the personalisation of learning and accessible content for a range of learning needs including the provision of accommodations for students with disability (AITSL 2024)
- Establishing student digital literacy (ATISL 2024)
- Using technology to facilitate effective learning design rather than deploying technological tools for their own sake (AITSL 2023).

However, due to considerable gaps in the literature, how to best implement these recommendations in distance education contexts is not always clear.

Research into the use of emerging technologies in distance education is scarce, and establishing effectiveness can be challenging given the pace of technological change (AISTL 2023). Often there is a repeating hype pattern, where promising anecdotal results from initial trials inspire wider adoption of new technologies, but when those results are not replicated, the technology falls out of favour as hype develops for the next (AISTL 2023). The literature includes many studies exploring how various digital tools and practices may help improve student engagement, such as gamification, augmented and virtual reality, interactive whiteboards, video conferencing and other online applications (Fryer et al. 2023). However, many of these studies lack robust experimental design and provide no link between student engagement and outcomes (Fryer et al. 2023).

While emerging technologies such as artificial intelligence have the potential to enhance student engagement and improve outcomes, particularly for distance education students engaging primarily with curriculum content via digital platforms, researchers also issue a note of caution for systems on the necessity of ensuring required oversight and equitable access. In a review of the policy environment relating to the implementation of digital learning technologies in Australia, Loble and Hawcroft (2022) draw attention to the capacity of educational applications of artificial intelligence to potentially reduce educational disadvantage. They note that emergency learning from home during COVID-19 illuminated some of the key challenges in equity provision in remote learning – such as limitations on computer access and lack of sufficient home learning support for disadvantaged students – but also that Australia lags behind other countries in establishing the conditions for realising the educational benefits of new technologies. The authors identify several key factors required for the quality provision of digital learning technology that largely align with findings of research on these tools in the distance education context specifically. These include the need for localised technologies that are well-linked to curriculum, robust evaluation, an understanding of the way teachers use the technology, directing technology towards priority cohorts, and ensuring safe and equitable access.

Technology is often poorly integrated into educational settings. For example, augmented, virtual and mixed reality have been found to be largely used as alternative media for presenting existing lesson content rather than as a platform for interactive learning (Maas and Hughes 2020). Equity of access to computer equipment and reliable internet access means distance education providers should approach new technology with caution, especially for students in remote areas, those from lower socio-economic backgrounds, and Aboriginal and/or Torres Strait Islander students (AITSL 2024; Wade et al. 2022; Cowden et

al. 2020). However, there is some solid evidence supporting the use of technology in education, particularly for the use of online lesson delivery to supplement in-person teaching.

There is evidence suggesting that blended in-person and online learning is effective across all subjects and educational stages. A meta-analysis by Yu et al. (2023) looked at 133 K-12 and tertiary studies into blended learning to determine its effect on learning outcomes, accounting for moderating factors such as educational stage, subject, and teaching method. The analysis returned a positive upper-medium effect size, meaning that blended learning was generally better than comparison and control groups throughout the literature (Yu et al. 2023). Results also suggest that better blended learning outcomes are achieved when educators use both asynchronous and synchronous online delivery methods (Yu et al. 2023). Different teaching methods were found to be a moderating factor in blended learning environments, with inquiry-based learning, peer teaching and discussion, lectures and demonstrations all returning positive effects (Yu et al. 2023). Though these findings may not be directly applicable to all distance education contexts, they offer insight into the changing nature of teaching and learning, and the expanding roles of technology and remote learning environments.

The capacity for educational technologies to provide accessibility adjustments for students with disability is frequently observed in the literature. This can include use of a variety of strategies including specific assistive technologies (for example, captioning, screen readers), the presentation of class content via a variety of media formats, the asynchronous presentation of content, and self-paced learning activities (AITSL 2024). Technology can also be used to meet the behavioural and socio-emotional needs of students with a disability by reducing barriers to participation, reducing sensory input, and encouraging self-regulation (AITSL 2024).

Evidence on the effective design and use of LMSs is particularly relevant to distance education. LMSs provide the technological foundation for online student learning, hosting course content, assessment activities, communication and organisational tools. LMSs have great potential to facilitate student engagement through interactivity, and to save teachers' time by sharing resources, conducting learning analytics, and communicating more effectively (AITSL 2023). However, global surveys have found that many LMSs do not feature any interactive content (AITSL 2023). A review of digital education practices and research by the Organisation for Economic Co-operation and Development (OECD) similarly shows only a small fraction of courses made use of the full LMS functionality (OECD 2024).

The increased use of online environments in distance education may increase the potential risks of cyber bullying and excessive screentime (AITSL 2024). Australian government guidelines recommend up to 2 hours of screen time per day for 6–17-year-olds, yet this applies to sedentary recreational use only and are no consistent parameters that apply to technological use for education purposes (AITSL 2024). Although most studies do not distinguish between educational and recreational screen time (generally categorising internet-use, television and gaming), increased screen time has been linked with poorer academic performance, associated with less sleep (with consequences for student mental health, memory and concentration), and identified as a risk factor for cyberbullying (AITSL 2024).

Home supervision

Distance education teachers have less visibility over student participation, meaning parents and caregivers play a greater role in monitoring student engagement and progress towards learning outcomes. In New South Wales, enrolment guidelines require an adult to supervise distance learning on a day-to-day basis, and parent and caregiver supervisors have been found to play a crucial role to ensure the engagement of students, particularly younger children (Downes et al. 2020). The demand for learning supervision has seen a growth in demand for home-based tutors (Peel et al. 2022), though their professional status is not always adequately recognised (McLennan et al. 2022).

Parental involvement has been shown to contribute to engaging online learning environments. Curtis and Werth (2015) conducted a series of interviews with parents of current and former students at an online K-12 school in the United States, revealing the most successful students (by approximate grade point average) were those whose parents monitored their engagement with class content, provided immediate feedback and communicated regularly with the school. Parents indicated that they valued the transparency the school provided by sharing access to the schools' LMS, which allowed them to monitor their child's progress, and suggested their involvement in student learning helped to increase the self-reliance and motivation of their children (Curtis and Werth 2015).

Research has sought to quantify the impact of parental involvement on student performance. For example, Ricker et al. (2021) analysed LMS data to examine the relationship between the number of parental logins (including those of parents, caretakers and home tutors) with the mathematics performance of 1,755 students across 3 US virtual schools (including elementary, middle and high school). Ricker et al. (2021) found a small but statistically significant positive effect across all 3 grade bands, noting that while parental involvement has frequently been linked to student performance in conventional school settings, there is a much higher expectation for parental involvement in online learning, despite the barriers to their involvement (such as technical literacy) and the lack of clearly defined requirements for parents.

Supervision responsibilities can be more demanding for the parents and caregivers of students with disability. Haas et al. (2022) interviewed teachers, parents and students about the benefits and challenges of delivering a hybrid distance education program for students with autism spectrum disorder. Developed by a specialist non-for-profit autism-specific school in western Sydney run by Autism Spectrum Australia, the program included a combination of individual, small-group and large-group online lessons, offline learning activities, and 3-day in-person residential sessions. Parents reported that enrolling their children in distance education was a last resort, largely in response to perception of inadequate support provided in mainstream schooling and had concerns about the impact of this on their children's emotional health (Haas et al. 2022). While most parents appreciated the flexibility of scheduling permitted by distance education, and most participants reported an increase in student learning, engagement and mental health, the level of parental supervision required was recognised as particularly challenging, as was the high workload for teachers in preparing highly individualised learning plans (Haas et al. 2022).

Due to the high supervisory demands of distance education, some parents choose to either engage home-based tutors to supervise their children's participation in online learning or

formally appoint a family member to take on these supervisory responsibilities (Radcliffe 2023; Peel et al. 2022). Peel et al. (2022) define distance education tutoring as a specific occupation with distinct professional requirements, whether the tutor is externally employed or a parent/guardian. To better conceptualise this workforce, Peel et al. (2022) conducted a survey on the demographics, self-perception and job satisfaction of distance education tutors across Australia, with a focus on geographically isolated students. The 575 participants, representing both professional and immediate family tutors, were overwhelmingly female (99%) and the majority supported primary school students (82%). Peel et al. (2022) find that while tutors generally agree that they find their work as tutors fulfilling and report a sense of belonging in their work, mothers who supervise their own children report a greater burden of accountability for educational outcomes.

McLennan et al. (2022) argue that university credentials should be available for remote education tutors to recognise their professional status and to help build the capability of the workforce. Based on the same national survey data used in Peel et al. (2022), McLennan et al. (2022) identified the shared career progression and professional development challenges faced by the two main tutor groups: externally employed tutors, a largely transient workforce with between one- and two-years' experience; and immediate family tutors, predominantly mothers who frequently report that supervising their students' learning has prevented them from undertaking paid employment. McLennan et al. (2022) argue that a partnership model where universities offer microcredentials to formalise recognition of teaching expertise of distance education tutors using the Australian Qualifications Frameworks' Recognition of Prior Learning procedures would have the potential to facilitate career pathways into other teaching roles, increasing economic participation opportunities for tutors and strengthening the rural education workforce.

Enhancing system delivery

The rapidly advancing technological and pedagogical maturity of remote education delivery has caused researchers and systems to identify the potential of distance education to supplement in-person schooling. This includes policy papers and evaluations of specific virtual programs and analysis of how school cohorts responded to emergency remote learning during the COVID-19 pandemic.

Distance education offers systems opportunities for providing greater learning flexibility and curriculum breadth

Flexible learning has often been conflated with distance education. However, a Queensland Curriculum and Assessment Authority (QCAA 2017) report into flexibility in senior secondary schooling defines the concept more broadly, distinguishing 3 key dimensions: flexibility of delivery mode, flexibility of accommodations (the location where learning takes place), and flexibility of time. Several case studies of flexible learning practice in Victoria, South Australia, New South Wales and Queensland show systems can utilise flexible learning strategies (QCAA 2017). This includes the use of distance education and blended learning to (QCAA 2017):

- accommodate variable progression for students who require extended or compressed course duration

- provide a broader curriculum (including vocational learning and extension courses)
- share resources between school campuses across regional and remote areas
- improve equity through adopting a student-focused approach to support students with different learning needs.

The potential for the dual use of distance education as a standalone provision and as an asynchronous component of blended learning design for classroom-based students has also been noted (Radcliffe 2023).

Research has highlighted the value of online learning tools in delivering a broad curriculum and supporting the needs of specific student groups, particularly in rural and remote areas. For example, an interactive online music program has been found to enhance music curriculum delivery for rural and remote Victorian schools (Crawford 2017). A virtual selective high school program (xseI) has been found to support students in western New South Wales (Bannister et al. 2015)¹. A case study has shown the effectiveness of videoconferencing to facilitate foreign language learning across two Victorian primary school networks (Slaughter et al. 2019). Blended learning approaches have been shown to facilitate learning differentiation and personalisation in mathematics across regional and metropolitan Australia (Attard and Holmes 2022). These studies also demonstrate the capacity of these approaches to facilitate professional development for participating teachers (Attard and Holmes 2022; Crawford 2027).

System level insights from emergency remote education during the COVID-19 pandemic

COVID-19 created a large-scale natural experiment in learning from home which has been widely studied by education researchers worldwide. There are important contextual differences to consider when applying findings to distance education, such as student demographics, duration of remote learning, and specialisation of staff (Radcliffe 2023; Knipe 2023). Yet this unique period provides valuable insights about the effectiveness of different approaches to remote learning delivery and the role of distance education in supporting broader system aims.

During and following the remote learning period, a number of evaluations and guides to online learning were published based on existing literature and observations of practice reported as effective by schools. Several key themes can be noted across these reports:

- The importance of establishing and maintaining teacher presence in online learning spaces (AITSL 2020; Wade et al. 2022) and prioritising the flexible delivery of high-quality teaching practices and learning resources (AITSL 2020; Cowden et al. 2020)
- The potential of teacher and peer collaboration to enhance student learning and reduce feelings of isolation (AITSL 2020; Wade et al. 2022; Cowden et al. 2020; Bond et al. 2021)

¹ Note the xseI program has concluded and selective programs for rural and remote students are currently provided in NSW by Aurora College. Students participate in selective classes online, with the balance of the curriculum completed at their local school. Programs are available to eligible high school students and opportunity class students in years 5 and 6 (NSW Department of Education 2025).

- Teachers should maintain student engagement via use of synchronous learning activities and clearly scaffold tasks to avoid overwhelming students (Bond et al. 2021)
- The benefits of focusing on quality rather than quantity of online time (AISTL 2020; Cowden et al. 2020; Wade et al. 2022)
- The significance of supporting student self-regulation (Wade et al. 2022)
- That assessment practices should be maintained and adapted using appropriate online tools to monitor student progress (Bond et al. 2021)
- The effectiveness of supporting families to engage with student learning and create a productive home learning environment (AITSL 2020; Cowden et al. 2020; Wade et al. 2022; Bond et al. 2021)
- The necessity of reliable technological infrastructure, and that choice of technologies should be made with consideration of equitable access (Wade et al. 2022; Cowden et al. 2020; Bond et al. 2021).

The period revealed how systems can better support teachers delivering remote learning. Kearney et al. (2022) conducted interviews and focus groups with teachers, school leaders, and students from two regional and two metropolitan New South Wales independent schools to identify the common features of effective emergency remote teaching. Effective teachers adapted to the online environment by designing a mix of synchronous and asynchronous, digital and non-digital learning activities and reduced screen time to ensure that live sessions provided quality teacher engagement and student interaction (Kearney et al. 2022).

Teachers noted that reducing synchronous instruction reduced the amount of time available for explicit teaching, yet many reported successes using new media to create additional instructional content to compensate. Communication with parents was frequent and targeted at supporting families to facilitate learning activities (Kearney et al. 2022). Prestidge (2022) analysed teacher responses to the shift to remote learning, identifying a need to develop the pedagogical competencies of teachers to facilitate online learning, particularly those that extend beyond digital literacy. Prestidge (2022) argues that as many classroom practices do not translate well to online learning, teachers should be supported to engineer learning environments which maintain the cognitive, social and behavioural engagement of students.

For students with disability, the learning from home period presented specific logistical challenges for teaching and learning. Medhurst et al. (2022) reviewed studies published during COVID-19 that focused on learning from home for students with a disability, identifying challenges and opportunities for families and schools, and strategies to support student transition back to in-person schooling. Medhurst et al. (2022) found learning from home reduced distractions, provided more flexibility to accommodate breaks, and provided opportunities to engage in independent self-paced learning. Teachers reported more opportunities for personalised learning, but that these were limited by time pressures. Use of technology was observed to improve accessibility for some students by offering a range of learning modalities (for example, video, audio, text) but equity of technology access and limited accessibility support was an issue for others. Strong communication and partnership between schools and families were found to improve educational and social outcomes. The authors argue that these findings emphasise the importance of quality differentiated teaching practice and Universal Design for Learning for both remote and in-person learning (Medhurst et al. 2022).

The response to COVID-19 demonstrates the importance of distance education to the wider education system. Knipe (2023) situated the response as an example of the evolving use of distance education to serve a wider range of students who are learning remotely but are not necessarily geographically remote from school. Knipe (2023) argues that by continuing to restrict access to distance education to certain student cohorts, governments limit the development of effective new approaches to delivering flexible learning for all students.

Conclusion

Rapid advancements in technology have transformed distance education, with growth in the quality and availability of remote curriculum delivery expanding the provision of distance education to new and diverse student cohorts. Research demonstrates that the most effective distance education programs are those that incorporate interactive teaching methods, promote collaborative interactions, and actively involve parents and carers.

Despite the potential of distance education to enhance system delivery, significant challenges remain. Many educators lack the specific training necessary to effectively implement remote teaching strategies, and the cost of provision is comparatively high. Disparities in access to technology continue to hinder equitable learning opportunities, and students learning remotely can face challenges maintaining engagement in their studies due to the higher requirements for self-regulation.

Educational systems are increasingly recognising the value of distance learning to supplement classroom delivery, support diverse learning needs, and share resources across schools. When barriers to access are addressed and teachers are equipped with the specialised skills required for remote delivery, distance education has the potential to provide an effective, inclusive and adaptable supplement to in-person learning.

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