Appendix 5: Digital learning

The practice of using digital technologies within learning and teaching has been widely promoted in the HE sector for more than three decades. The premise of digital learning (DL) is that digital technologies encourage and facilitate education reform, where learners shift from being passive receptors of information to self-regulated, active participants in the construction of knowledge (Shroff et al., 2019). Of course, the technologies used within the sector have changed over time. Panellists in the 2020 Educause Horizon Report (conducted pre-Covid) were asked to describe emerging technologies and practices they believed would have a significant impact on the future of post-secondary teaching and learning. Their responses included: adaptive learning technologies; Artificial Intelligence (AI)/machine learning education applications; analytics for student success; elevation of instructional design, learning engineering and User Experience (UX) design in pedagogy; Open Educational Resources; and extended reality (XR) technologies. AI is already being used as part curriculum design, but the panel anticipated that it will increasingly be used to provide feedback on student work. It may also have applications for refining language translation and for improving access for students with visual or hearing impairments. Applications that give students access to learning analytics are also becoming more common, enabling students to access and track their individual data through visualisations (Educause, 2020).

5.1 Digital Learning principle

All programmes will use digital learning approaches appropriate for the discipline, curriculum, pedagogy, and context.

Objective	Evidence
DL1 Programmes will provide significant opportunities for all students to develop skills in digital learning and digital literacies appropriate to the discipline.	5.2.1, 5.2.3, 5.4.1
DL2 Modules and assessments will be designed to use the most pedagogically appropriate digital tools and resources as supported by Durham University.	5.2.2, 5.2.3, 5.2.4, 4.2.5, 5.3.1
DL3 Modules will have a Virtual Learning Environment (VLE) presence appropriate to their pedagogic design (e.g. traditional, flipped classroom, blended, fully-online).	4.2.6, 5.3.3, 5.4.3
DL4 Teachers are encouraged to curate and embed open educational resources in their modules and make their own resources openly available.	4.2.7, 5.3.2, 5.4.2
DL5 Innovations in digital pedagogy will be evaluated to develop an evidence-based approach to digital learning practice.	Feedback from consultation

5.2 Evidence from literature

5.2.1 Digital learning in higher education

Technology trends identified by Barosevcic and colleagues (2021), on behalf of Educause/Jisc, focus more on the immediate practical applications of technology in HEIs. These include a shift to digital textbooks and improvement in textbook interactivity; the rise of MOOCs as courseware; a rise in digital curricula quality; virtual learning environment product and ecosystem improvements; assessment technology improvements and increased openness to online testing; and developments

in students support such as micro-tutoring on-demand support and grammar and citation support. Technology can also be used to support digital skills development and employment-relevant activities. Examples include students collaborating on real-world or employer-relevant tasks; the use of online simulations or virtual reality to provide practice in simulated employment-like environments; and digital communications and engagement with employers. Technology can support the planning, reflection and managing of learning, such as through e-portfolios or reflective blogs, and enable feedback from key stakeholders such as employers (Jisc, 2019).

Despite more adventurous possibilities for the use of technology in teaching and learning, such as those described above, studies suggest that technology is predominantly used to support existing educational practices (Damşa et al., 2015; García del Dujo & Martín-Lucas, 2020; Lillejord et al., 2018). Orr and colleagues (2019) report "a notable persistence of what might be deemed older technology", such as wikis and LMS. Flavin and Quintero's (2018) survey of strategy documents reports a focus on making existing practice more efficient rather than rethinking practice through the use of technology. However, they acknowledge that there can often be a misalignment between HEIs' DL strategies and the day-to-day practices of students and lecturers. The student academic experience survey from Advance HE/Higher Education Policy Institute (HEPI) notes that the overwhelming majority report only basic technology (as defined by students surveyed) is used as part of teaching – yet where advanced technology (e.g. Adobe Creative, Panopto, SPSS) is used, students are significantly more likely to feel they have received good value, that they have learnt a lot, and that the skills they have gained will play a key role in their future (Neves & Hewitt, 2020).

Børte and colleagues (2020) note that teachers' conceptions of teaching, lack of digital competence and added workload are among the barriers to the implementation of technology-supported education. From the perspective of students, Kennedy and Dunn (2018) noted that they are expected to engage with multiple pieces of software that may be new to them, often without training or direction in their use. An example is the increasing use of learning analytics which can offer the ability for instructors and students to view data about teaching and learning through visualisations. However, this kind of data interpretation may require more training than is offered to the typical instructor, advisor, or student (Educause, 2021).

5.2.2 Online engagement

Based on a literature review of online engagement in the higher education environment, Redmond and colleagues (2018) devised a framework that includes five key elements considered essential to effective online learning: social engagement, cognitive engagement, behavioural engagement, collaborative engagement, and emotional engagement. Pre-Covid, the majority of online learners were non-traditional students who needed to balance the competing demands of work, life, and study commitments and elect to study online for the convenience it offers (Chen et al., 2010; Thompson et al. 2013).

Moving certain activities to an online environment may benefit particular groups of students. For example, several studies have found that moving office hours online positively impacts levels of engagement by underrepresented and disadvantaged groups (Hooper et al., 2006; Cifuentes & Lents, 2010). In their research into the experiences of students with disabilities learning in an online platform, Kotera and colleagues (2019) report that these students found accessibility, flexibility, and self-paced nature of online learning particularly helpful to their studies, fitting their study times into their professional and family lives. Less social pressure and stigma on disability was reported as another advantage of online learning.

5.2.3 The pandemic

EDUCAUSE's Horizon Report (2021) states that HEIs' adoption of blended or hybrid (used synonymously here as environments 'providing an equitable learning experience for in-class and remote students') models for course delivery has accelerated dramatically over the previous year due to the implications of Covid and this was expected to "leave an indelible mark on the postsecondary classroom and fundamentally transform traditional approaches to higher education" (p.8). Institutions and instructors who were previously resistant or indifferent to tools such as videoconferencing, team-based platforms and virtual classrooms have come to rely on those tools as essential to their work (Educause, 2021). Technologies which experienced significant investment during 2020-21 and 2021-22 academic years included assessment technology, lecture capture and virtual laboratories (Jisc, 2020). Educause (2021, p.7) forecast that "remote modes of higher education will live on in some form or another in a post-pandemic future" and as a result, "students will need to develop new skills and literacies to be better equipped for remote learning and to better thrive in more isolated and independent virtual environments".

The move to online learning during the pandemic was not unproblematic, of course. A survey of UK HE teaching staff (Jisc, 2020) reported a number of basic problems experienced when teaching online during the Covid pandemic including poor wifi connection, access to online platforms/services and lack of specialist software. Four-fifths of respondents felt that online teaching created technical challenges and three-quarters said it had added significant new stress to their workload (Jisc, 2020). Nevertheless, research into students' experiences of online and blended learning in February 2021 found that the great majority wanted some aspects to continue, including recorded lectures and online tutorials or check-ins with tutors (Pearson and Wonkhe, 2021). Barber (2021) reported that teaching staff polled were most likely to cite one-to-ones with students and engagement with colleagues as the aspects of digital teaching and learning that should remain. Staff confidence with technology has improved, alongside a new openness to experiment, but they remain unclear about how to use technology to create a strong connected teaching experience (Barber et al., 2021).

Despite enthusiasm for retaining some aspects of online learning, a consistent finding across EDUCAUSE (2021, p.18) student studies is that "students continue to want face-to-face classes more than any other learning environment, with a majority preferring either completely or mostly face-to-face". In the 2021 Student Academic Experience Survey (Neves & Hewitt, 2021), students responding also identified a preference for in-person learning. Only 12% preferred online learning outright, with 31% preferring a blended approach. This finding was relatively consistent across students from different backgrounds, domiciles and institutions. However, there was more support for online learning among students in the later stage of their degree and amongst students from private school backgrounds.

Online learning can lack the social or human aspects and can be isolating and lonely for students (Jisc 2020) particularly if poorly-designed. Lecturers have reported similar feelings, with many finding it more difficult to build up relationships and rapport with their students online and expressing concern that their interactions have become depersonalised and more muted in-person interactions (Jisc, 2020). Indeed, as Bonfield and colleagues (2020) emphasise, just because something is technically feasible, it does not necessarily mean it should be done or that its effects will be overwhelmingly positive.

It is worth noting, as Barosevcic and colleagues (2021) point out, if temporary fixes and workarounds introduced to cope with restrictions during Covid become enduring solutions, "there is a risk of embedding all sorts of inadequacies and inequities in provision, some of which universities haven't yet had a chance to think through" (p.10).

5.2.4 Dual mode/synchronous hybrid teaching

Dual mode/synchronous hybrid teaching became common during the pandemic and describes the situation where synchronous classes support online and onsite students simultaneously. Sometimes referred to a hybrid teaching, we use the term dual-mode teaching because 'hybrid' is also commonly used as a term synonymous with 'blended' and is therefore ambiguous. Berthoud and colleagues (2021) found that, when teaching was delivered in a dual-mode format where students could attend a session either in-person or online, it did successfully allow teaching on the same basis for all the students, no matter where they were. However, it was challenging to deliver for staff. As Hodges and colleagues (2020) emphasise, "distinction needs to be drawn between the education that was delivered in the spring and summer of 2020, or what has aptly been called emergency remote teaching, and the skilful and well-researched methods of online education". The main pedagogical challenge reported for dual mode/hybrid teaching is that onsite students and remote students experience the lesson differently in the dual mode model (Beatty 2007, 2019; Szeto 2014; Zydney et al. 2020). In particular, remote learners often feel a significant sense of distance towards their teacher and their face-to-face classmates (Ramsey et al. 2016) and can find it difficult to alert the teacher when they want to ask/answer a question, which makes them feel frustrated and uninvolved (Weitze et al., 2013). Raes (2022) did not find any significant differences between physical and remote presence regarding students' conceptual understanding, but significant differences were found in affective engagement (opportunities to interact) in favour of onsite students.

4.2.5 Lecture capture

While the practice of recording a teaching activity is not new, advances in technology, particularly the ability to automatically store and retrieve large amounts of video data, have prompted a boom in lecture capture across the HE sector over the last decade (MacKay, 2020). Kennedy & Dunn (2018) found students had a preference that all lectures should be recorded using technologies which merge lecture slides and audio. Dommett and colleagues (2019) noted that lecture capture may be particularly beneficial for learners with health issues who may have to miss lectures. However, where lecture capture is provided as a default option, it should be promoted as a supplementary resource for students, and students should be provided with explicit guidance regarding how to make use of recordings (Nordmann and McGeorge, 2018).

In Robson and colleagues' (2022) study of post-pandemic lecture practices across UK HEIs, the most retained component was the use of pre-recorded lectures. This was not necessarily to replace the entire lecture experience but short videos, perhaps enhanced with graphics, animation or use of videoclips, that students were expected to watch at specific times during the course, usually as part of a flipped classroom approach. Staff also wanted to see lecture capture technologies have multiple inputs rather than just slides, audio and video of the lecturer to allow a better capture of their teaching which may include ad hoc use of visualisers or whiteboards. Frick and colleagues (2020) describe recording pre-lecture materials which allow students to see PowerPoint slides and exercises solved using a visualiser, while hearing the voice of the lecturer explaining the concepts.

In Robson and colleagues' (2022) study, the most cited technology was the need for captioning which was driven by the desire to create inclusive and accessible learning but also meet legal requirements. However, as Al-Ataby (2020) notes, while automatic captioning is convenient, it lacks accuracy with technical terms so the teacher often needs to edit the transcript file of the lecture and correct mistakes manually, which adds additional workload to staff.

4.2.6 Virtual Learning Environments

Kennedy and Dunn (2018) describe how VLEs allow students to locate course-wide materials in a single location, thus enabling them to spend time engaging with resources, which would have historically been spent on locating them. However, while the VLE is valuable for handling the administrative aspects of a course, it is often less successful in effectively facilitating learning. Orwell and colleagues (2018) outline four values to promote good practice in VLE use:

1. Consistency – students should always be able to find relevant information and find it in the same place.
2. Coherency – learning designs should reflect current research on good practice and the institutional policies and initiatives.
3. Transparency – students should have clarity with regards to expectations and assessment criteria in order to learn more effectively.
4. Accessibility – all materials should be accessible to students regardless of their particular situation.

As Beggan (2020, p.2) points out, there is a "perception amongst some users that VLEs, whilst important, are increasingly feeling old-fashioned". However, there are examples of more innovative uses of VLEs. For instance, Cross (2019) made use of existing VLE functionality to deliver differentiated learning and student choice (using Moodle's conditionality APIs and associated tools). Beggan (2020) advocates the move from a 'walled garden' approach to open access (within a university domain) across all modules or resources. He argues that this would support the use of library systems as the central repository for all teaching resources and facilitate site-wide search, personalised recommendations and serendipitous discovery across disciplines.

4.2.7 Open Educational Resources (OER)

Open Educational Resources (OER) are "learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, reuse, re-purpose, adaptation and redistribution by others" (UNESCO 2019: 3 f). Whilst empirical research is limited (Otto et al., 2021), OERs have the potential to broaden access to education, reduce the costs of material and improve the overall quality of teaching (Otto, 2021). They afford individual educators the capacity to change their teaching more easily than would be possible with proprietary resources (Coughlan et al., 2019). However, whilst OERs have become widespread, levels of adoption remain low (Mishra, 2017; Otto, 2021). Barriers include a lack of time, legal uncertainty and institutional barriers (Bozkurt et al. 2019). However, Otto (2021: 11) argues that "the removal of structural barriers in educational institutions whilst important would not be sufficient to increase the adoption of OER"; in addition to addressing barriers such as time and skills, it is important to ensure that positive attitudes towards sharing, exchange and cooperation are entrenched as guiding principles for teaching and learning. OER are becoming more widespread in the sector, one such example being the University of Edinburgh[1].

5.3 Evidence from student consultation

5.3.1 Digital tools and resources

The potential benefits of DL for students include: being able to access specialist resources from off-campus; opportunities for interaction/audience participation; time savings; and support for specific learning needs. Students found lecture recordings helpful and used them in a variety of ways, including: to reinforce a face-to-face lecture when the lecturer spoke quickly or introduced complex ideas; as an alternative to attending face-to-face lectures where the lecturer simply read out their

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[1] openeducationalresourcespolicy.pdf

slides; if they missed a lecture (e.g. through illness); and for revision purposes. On courses where not all lectures were recorded, students felt this would be helpful.

Students suggested that there could be greater use of technology to support better learning collaboration and interaction:

> *I kind of wish there was more [technology] that foster engagement. And right now, the only working platform where we can kind of ask the lecturer questions is the Blackboard discussion…that page isn't really used because students don't really access that kind of thing. And I wish there was another working platform, like outside of it, where basically, students can pose questions and the lecturer can properly interact with it... (FG3)*

Challenges around DL include: access to equipment and Wi-Fi, mostly off-campus; usability issues; lack of social interaction; and staff and student knowledge/skills. In particular, students described how some staff seemed to struggle when using technology in teaching sessions.

> *...the technology is good. But I think not all teachers are very comfortable with it. Like some are very tech savvy…But there are some obviously, who are not that savvy, and they have problems fixing it. (FG4)*

5.3.2 OERs
Whilst OERs were not explicitly discussed, students would like more information about resources and technology that could support their learning from their tutors. There was a feeling that, at present, students were expected to discover these for themselves.

> *There's an app…I've found it so useful…But all of that you sort of had to go find yourself. And then once I found it, I would share it with other people in my course. (FG4)*

In addition to more traditional 'resources', students felt that technology could be used to bring in experts from outside the university.

5.3.3 VLE
Students were generally positive about the use of Learn Ultra, although it was felt that clearer/more consistent organisation of modules and improved ways of facilitating online discussions would be useful.

5.4 Evidence from staff consultation

5.4.1 Digital tools and resources
In general, Covid had a positive impact on staff digital skills as they were compelled to become more proficient in the use of technology. However, the reliance on online delivery during the pandemic was perceived to have had a negative impact on student engagement and made the communal aspect of learning more challenging, with some staff feeling students were engaging and interacting less. A lack of student interaction online was the most frequently discussed challenge of DL. Being able to judge how students were responding to teaching was challenging, especially when most had their cameras turned off. There were also considerations around the freedom some international students might have to share views online.

> *…we're now teaching students who've experienced a lot of online studying for at least one year or some years. And I think they have different expectations about the social interaction or the community dimension of teaching, you know, being physically present in the same room. I think that's something we have to address…going forward, the sort of going back to the dialogue…as a community and in groups. (Group A)*

Staff described ways in which they ensured that digital resources were designed and configured in pedagogically appropriate, and sustainable, ways.

> *I didn't do whole recorded lectures to put online…I broke everything down into small chunks. I did videos that were only about five minutes long and they were only on a very specific bit of content, that wouldn't change, they're self-contained. And then I linked those together with text or references to websites…trying to stimulate the students to use that material. But that would mean it was linked together in a way that could be reconfigured later (Group C)*

Most staff felt there were benefits to recording lectures, but there were concerns about the time taken, limitations of current recording software and the potential impact on students if they did not use the recordings in the way intended (e.g. spent significantly longer than anticipated). There were also challenges around the types of support students might need to make effective use of DL. This included basic skills in the use of particular software, but also more nuanced understanding of digital pedagogies.

The types of support staff felt were needed to better support DL fell into the following categories: improvements to the lecture capture process, especially around the capture via visualisers and captioning; greater consistency in technology available across teaching spaces; more staff training on the use of new teaching and learning technologies (including departmental level support); information about technologies already available to staff; and the investigation of new technologies to meet particular requirements.

> *I think one of the biggest barriers is just…really being aware of what's available to us. And then having the knowledge and the time to be able to learn it and master it...And then it's how do we share that knowledge as well? Because I know that you know, there are people across the university with some brilliant skills that they've developed will be really useful to lots and lots of other people. But how do you share that knowledge? (Group I)*

5.4.2 OER

Many staff direct students to online resources to prepare for, supplement or reinforce face-to-face learning activities. In some instances, these are resources staff have created themselves, but they might also include OER.

> *A lot of us have developed a sort of pool of additional recordings and materials which can be reused, which…can be used to kind of help students navigate their way through. (Group C)*

5.4.3 VLE

The relatively recent move to a new VLE meant that some staff were still not as familiar or confident as they would like to be using Learn Ultra, in particular with more sophisticated features such as peer feedback and submitting different assignment formats.

> *...everybody sort of picked up Learn Ultra and tried to learn everything they needed, just to get a class on to Learn Ultra...but additional functions have fallen by the wayside in the interest of just getting some materials on there (Group M)*

5.5 Digital learning at Durham University

This section details existing principles and polices at Durham University and discusses gaps that have been identified in the analysis of the current state of play regarding technology-enhanced learning.

5.5.1 Current DU Principles and Policies relating to Technology Enhanced Learning

- Principles for digital learning recognises the need to embrace the digital world and call for each programme of study to provide significant opportunity for all students, at every level, to develop skills in digital learning, including collaboration, creativity and assessment.[2]
- Lecture capture policy[5]
- Guidelines for the use of the Learning Environment[6]

5.5.2 Gap Analysis

The VLE has long been used as a means of collating module materials and communicating with students; along with the introduction of lecture recording in 2018 these were the main tools used in DL prior to the pandemic. The emergence of Covid-19, in 2020, dramatically led to widespread adoption of new digital tools and necessitated an emergency move to online teaching, largely through re-purposing existing materials that had been prepared for in-person classes.

Most students and staff want to return to predominantly in-person teaching sessions, but also see value in DL provision and would like to maintain and improve aspects in future. Students identified the need for improvements in online collaboration and communication tools, and staff and student knowledge/skills as current limitations. Staff explained how they had deployed teaching materials in interesting ways, whilst recognising these approaches would not be appropriate for courses designed for online study. The most frequently stated challenge was interacting effectively with students online, though the need for improvements in lecture capture (multiple inputs and captioning) were also identified.

Further consultation with students and staff should explore core DL provision and approaches for modules and programmes and identify improvements in DL provision and training. Needed to support their optimal use.

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[2] Learning and Teaching Handbook : 7.6: Digital Learning - Durham University