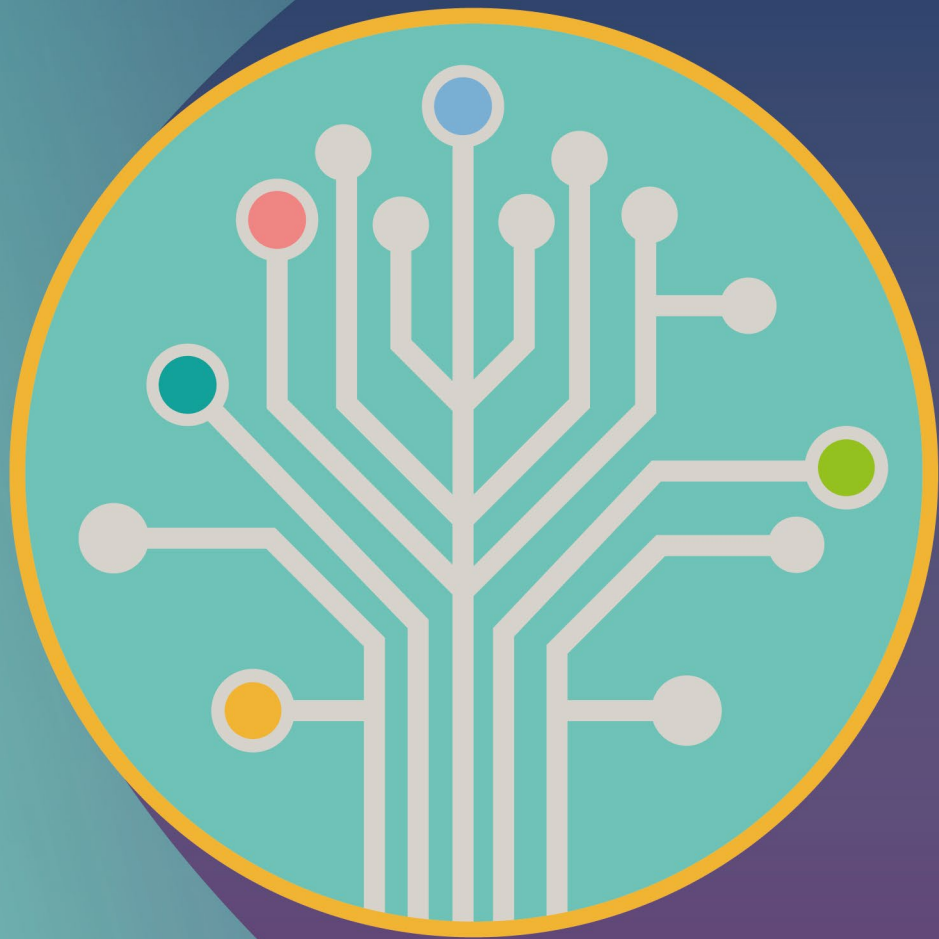


Gravity assist

Propelling higher education
towards a brighter future



Report of the digital teaching and learning review

Sir Michael Barber
February 2021

Gravity assist: Propelling higher education towards a brighter future – Digital teaching and learning review

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Foreword by Sir Michael Barber

1. In 2006, a probe roughly the size of a grand piano was launched into space from Florida. Its primary mission was to better understand Pluto and its moons – doing so would take nine years, at which point Pluto would be almost five billion kilometres away from Earth. No spacecraft had ever travelled such a great distance before reaching its target.
2. To fulfil its mission, the probe, known as New Horizons, had to rely on celestial help – a gravity assist from Jupiter. By passing close to the gas giant, the tiny spacecraft was able to use the planet’s immense gravitational pull to fling itself towards Pluto.¹
3. I see this report and the collective learning from the last 12 months as a sort of gravity assist for the sector. The dialogue I have had with students, staff, leaders and others in the sector has been marked by two features – the exciting and creative ways digital approaches are being used to ensure learning continues and is enhanced, and the warm enthusiasm with which these ideas are discussed. From further education colleges, through tech start-ups, to big multi-faculty universities, I have heard a huge amount of positivity, despite these trying times. Rarely in my career have I heard people state with such frequency that what they thought would take years has been done in a matter of weeks and days.
4. I hope the report will have real functional relevance to those working in higher education all over the world. I do not have all the answers, and the hard work is always in the implementation. I have sought to make the report as practical as possible, and hope to see many further education colleges and universities reflecting and applying the immediate recommendations for their next academic year. My overwhelming reflection from this work is how compelling the case for digital teaching and learning as a powerful force for good is. I hope this report makes a meaningful contribution to efforts around the world to realise this opportunity.
5. Our recommendations on digital access are perhaps the most important of all. Our definition, with its six components, gives educators a tangible framing for exploring access challenges with each and every student. Ensuring barriers are overcome quickly, before any learning is lost, is of paramount importance to providers and policymakers alike. I am pleased to see the government’s commitment to ensure access to digital resources for all students: it is critical that we collectively see this through.²
6. The report also has implications for the future. I do not predict that higher education will ever be fully online, nor should it be. But the pandemic has changed the situation forever. It may not have taken the form expected, but a disruptive avalanche has arrived.³ We should all work together to rise to the occasion and seize the opportunity – with the help of a gravity assist.



Executive summary

7. The first national lockdown in March 2020 sparked a rush of activity in universities and colleges to transition from in-person teaching to online delivery. This was done at great speed under intense pressure. By the time this review was commissioned in June, there was already a wealth of expertise and innovative practice to explore.
8. This report attempts to capture the lessons from an extraordinary phase of change. We conducted 52 interviews with digital teaching and learning experts and higher education professionals from around the world, received 145 responses to our call for evidence and surveyed 1,285 students and 567 teachers.
9. What follows is built on a vast array of learning and expertise and we are grateful to all those who contributed. Most importantly it offers a roadmap for the future. The review establishes what we take as the essential components of successful digital teaching and learning, and recommends core practices that all universities and colleges can use to improve for the benefit of generations of students to come.
10. The report does not represent regulatory advice or guidance. Instead, we are focused on sharing what we have learned, supporting reflection, and prompting further action, research and exploration of the ideas presented here. It is independent from the Office for Students's (OfS) regulatory functions and the recommendations should not be interpreted as regulatory requirements.

Adapting under pressure

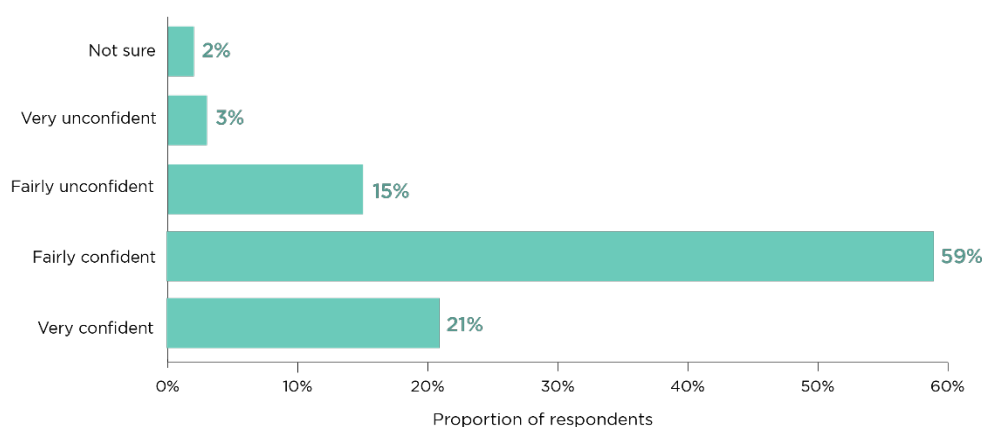
11. Universities and colleges across the country shifted at great speed, under great pressure, often into uncharted territory. 58 per cent of students and 47 per cent of teaching staff we polled had no experience of digital teaching and learning before the pandemic.⁴ By December 2020, 92 per cent of students of students surveyed were learning either fully or mostly online.
12. Video seminars, live and recorded online lectures, and lecture slides covered the bulk of digital teaching, with students also taught in digital labs, placements, and online performance and portfolio reviews. But these broad categories only scratch the surface.
13. Case studies in this review highlight the innovation on show. Digitally simulated scenarios for paramedic training, science experiments conducted with remote-controlled lab equipment, online master classes for music students, digital exhibitions connecting final-year portfolio students with industry experts and employers, virtual writing cafés – the speed and scope of adaption was extraordinary.
14. Universities and colleges were also forced to address issues of digital access. Previous polling by the Office for Students (OfS) found students impacted by unreliable internet connections, lack of access to appropriate hardware and software, and unsuitable home study spaces.⁵ Universities responded in a range of ways. Some delivered 4G dongles to students and expanded existing laptop loan

schemes for students in need. Other initiatives included making learning resources available on mobile apps and developing alternative modes of assessment.

What did staff and students say?

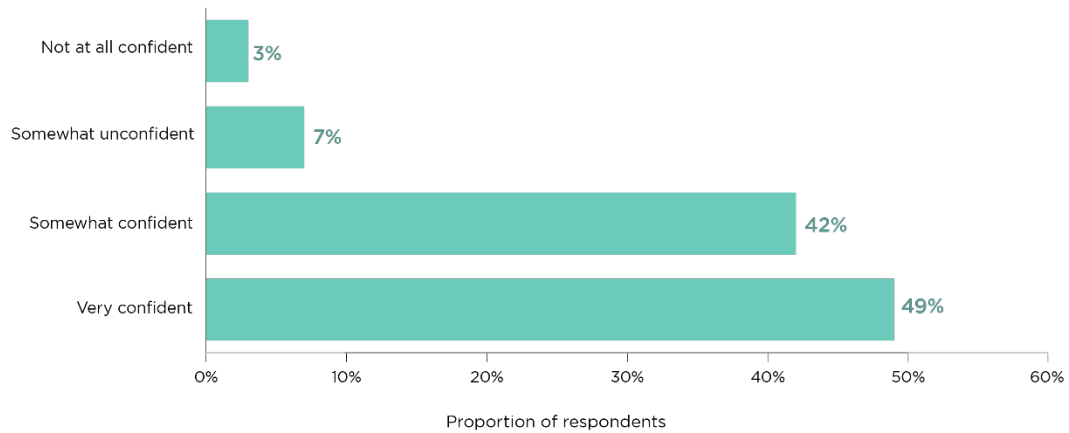
15. A range of polls and surveys have sought to capture student experience during the pandemic with varied results.⁶ Most students responding to our polling (67 per cent) told us they were content with their digital teaching. A similar proportion (61 per cent) said teaching was in line with their expectations, although 29 per cent said it was worse than expected. Almost half of students (48 per cent) said they were not asked for feedback on the teaching they have received.
16. Polling also highlighted the need for increased support for teaching staff. Only 21 per cent of teachers said they were 'very confident' that they had the skills to design and deliver digital teaching and learning. Almost half of students (49 per cent) were very confident that they had the skills to benefit from online learning (see Figure 1).

Figure 1: How confident or not are you that you have the knowledge and skills necessary to design and deliver digital teaching and learning? (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

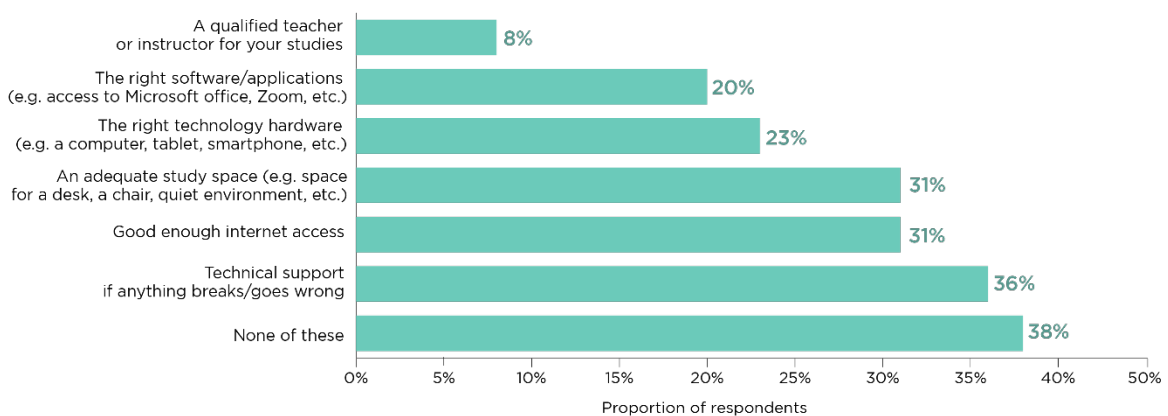
Figure 2: How confident or not are you that you have the digital skills necessary to successfully engage with the digital teaching and learning you are receiving? (students)



Note: Source of data is YouGov polling conducted for this review. This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

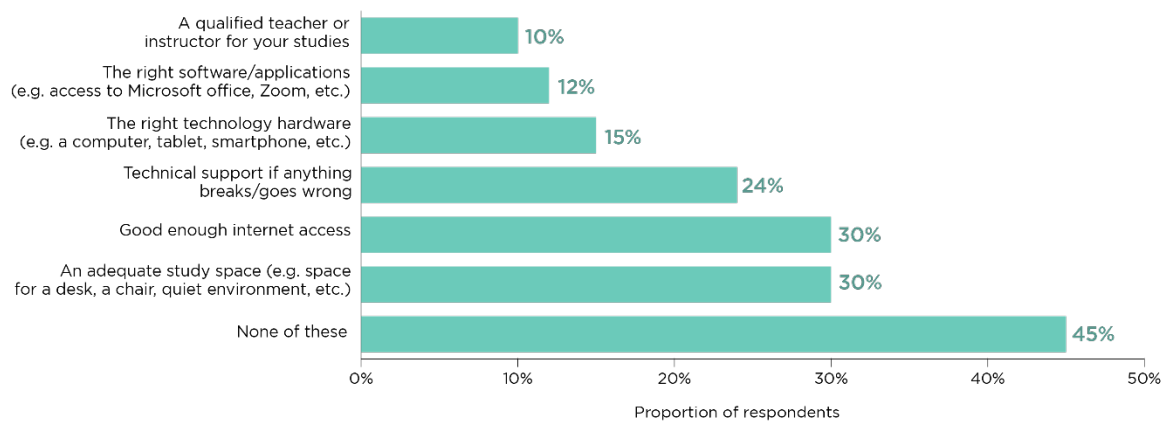
- Over a third of teachers (36 per cent) reported having no access to technical support while teaching digitally, compared with under a quarter of students. And 23 per cent of teachers felt they lacked the right technology, compared with 15 per cent of students.

Figure 3: While delivering digital teaching and learning, have you been without access to any of the following? (Please select all that apply) (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

Figure 4: While digitally learning this academic year, have you been without access to any of the following? (Please select all that apply) (students)



Note: Source of data is YouGov polling conducted for this review. This includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Seizing the opportunity

Professor Iain Martin, Deakin University (Australia)

‘Digital delivery will be the norm as the world moves to blending digital work and life with place-based activities.’

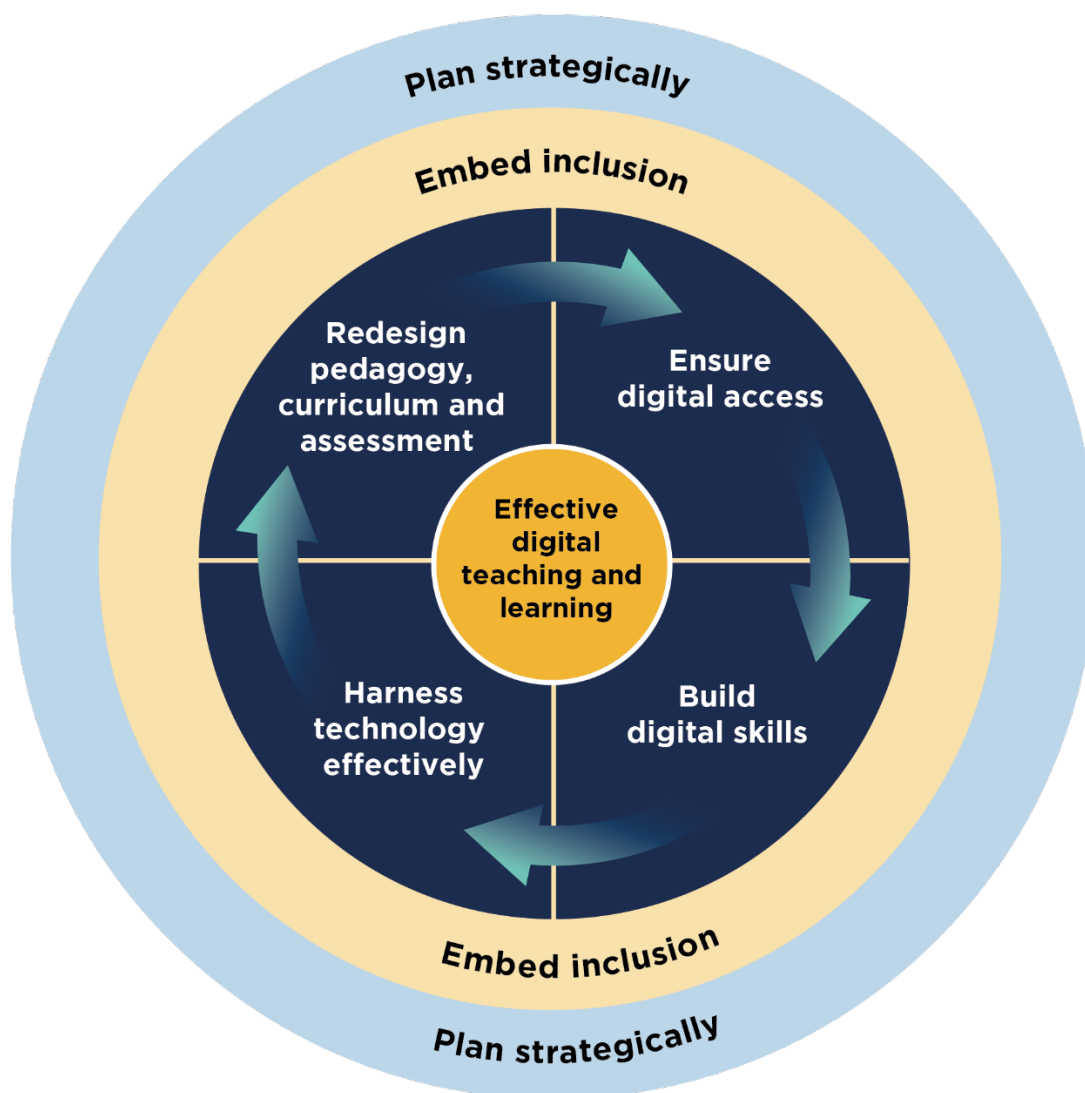
18. We heard this sentiment from Professor Martin repeated throughout the review. Despite the fraught circumstances of the pandemic, there was a consensus that innovation forced through lockdown may lead to lasting and positive change. Widespread digital teaching and learning is just not an emergency stopgap, but will have an important role in the future.
19. In a survey of international university leaders in May 2020, 55 per cent agreed that the experience of mass online teaching and the realisation of its possibilities will increase the use of fully online degrees at their institutions over the next five years.⁷ Our own polling found that 70 per cent of academic staff agree that digital teaching and learning provides opportunities to teach students in new and exciting ways.
20. Online teaching has a range of potential benefits, and in our research five broad positives stood out.

Five benefits of online learning:

- Increased flexibility.
- Personalised learning.
- Increased career prospects.
- Pedagogical opportunities.
- Global opportunities.

21. Several studies have compared in-person, online and blended courses, but there is little evidence that outcomes based on the mode of teaching differ significantly.⁸ The effectiveness of a course is based on the approach to the design and the quality of teaching rather than just how it is delivered. Digital teaching and learning can have enormous benefits, but it must be done well.
22. What does good digital teaching and learning look like? How can universities and colleges achieve it? Based on our review we have identified six core components of successful digital teaching and learning that educators can apply directly in their work.

Figure 5: The six components of successful digital teaching and learning



1. Digital teaching must start with appropriately designed pedagogy, curriculum and assessment.
2. Students must have access to the right digital infrastructure.
3. Good access enables staff and students to build the digital skills necessary to engage.
4. Technology can then be harnessed strategically, rather than in a piecemeal or reactive way, to drive educational experience and outcomes.
5. Inclusion for different student groups must be embedded from the outset.
6. All the elements need to be underpinned by a consistent strategy.

What does this model mean in practice?

Redesign pedagogy, curriculum and assessment

23. Technology cannot just be bolted onto existing teaching material. There needs to be a focus on **how** students learn. Instead of blunt attempts to replicate in-person settings, learning outcomes should drive how technology is used. For example, students said they benefited from round-the-clock access to resources ahead of taught sessions, like short instructional videos demonstrating lab techniques. When students then enter the lab, they already have an understanding and can use lab time more effectively.

Joanna MacDonnell, Director of Education and Students, University of Brighton

'The blended learning delivery model has provided the opportunity to begin to design out traditional long monologue lectures, through emphasising the "chunking up" of delivered content in pre-recorded and live MS Teams lectures, and through face-to-face sessions being dedicated to practical work, seminars and small group teaching.'

24. High-quality courses need rigorous and fair assessment – this does not always have to mean invigilated written exams in lecture halls. Universities moved thousands of exams from in-person to online and we heard of many approaches: open-book exams with a prescribed timeframe, online timed assessments and assessments based on digital scenarios. More work needs to be done to develop scalable approaches, particularly in addressing potential risks around plagiarism and ensuring that sweeping changes to assessment methods do not bake in unwarranted grade inflation.
25. However, it is clear that digital assessment is not just consistent with the maintenance of rigorous standards and consistency over time; when it is done well it can actually enhance it. Where this happens, it is more important than ever that there is strong moderation to ensure the maintenance of standards and the integrity of assessment and qualifications.

Digital access

26. The shift to remote teaching meant students needed to work in family homes or shared accommodation, worsening issues around access to the equipment, infrastructure and space needed to engage in their studies. Around 30 per cent of the students we polled lacked good enough internet access, and 30 per cent did not have access to an adequate study space.
27. We propose a definition of digital access which combines the essential things all students need to benefit fully from digital teaching, as shown in Table 1.

Table 1: Definition of digital access

Element	Criteria
Appropriate hardware	= Students have the hardware that allows them to effectively access all course content. Hardware is of the specification required to ensure that the student is not disadvantaged in relation to their peers.
Appropriate software	= Students have the software they need to effectively access all aspects of course content.
Robust technical infrastructure	= Technical infrastructure and systems work seamlessly and are repaired promptly when needed.
Reliable access to the internet	= Students have reliable and consistent access to an internet connection. Reliability and bandwidth of the internet connection are at a sufficient level for ensuring that a student is not disadvantaged in relation to their peers.
A trained teacher or instructor	= Students have a trained teacher or instructor who is equipped to deliver high-quality digital teaching and learning.
An appropriate study place	= Students have consistent access to a quiet space that is appropriate for studying.

28. We saw a number of short-term fixes attempted during the pandemic. But to address digital poverty effectively, the higher education sector will need to develop systemic and long-term solutions.
29. Universities that have adapted well to digital and blended learning proactively assess students' digital access on an individual basis. This means engaging with students before their courses start and offering practical solutions where necessary. This could involve loaning devices, offering financial support, or working with other local organisations to provide appropriate study space.

**Jenny Coyle, Programme Leader of HNC and HND Acting and Musical Theatre,
The City of Liverpool College University Centre**

‘One case I experienced this year was with a BA student who didn’t have access to a laptop nor wi-fi. She has a young daughter and could only really work after she had gone to bed. I worked with her using WhatsApp voice notes, which she performed some evaluative assessment on but also doing tutorials via phone [...] Our final assessed tutorial was on a video call via WhatsApp, which was recorded audio and video. This student was close to giving up at the start of lockdown, but has walked away with a 1st Class BA Hons Degree.’

30. Small adaptations to the way digital teaching and learning is delivered can make a big difference. For example, resources can be designed so that students who have lower bandwidth connections can access all content, and offline alternatives made available.
31. Evidence suggests that school closures will widen educational attainment gaps and universities are increasingly sensitive to the impact of the pandemic on school learning and lower-income households.⁹ Delivering on digital access is likely to become a more important part of meeting ambitions to improve access and participation for students from disadvantaged backgrounds.

Build digital skills

32. Students are confident in their own digital skills – significantly more than staff, according to our polling. However, universities and colleges can still improve the support and training on offer for students.
33. For next year, universities and colleges will wish to consider how to communicate to students the digital skills they need before their courses begin, how to help build these skills on the courses, and develop mechanisms for students to track their skills progression. There is a wider opportunity to align skills with those that graduates might be expected to have in work. By regularly using digital technologies, students are already building skills that are likely to be useful in the jobs they have after graduating.

Andy Beggan, Dean of Digital Education, University of Lincoln

‘One anticipated change for art-based programmes is courses placing more emphasis on developing student digital and website development skills in preparation for more virtual performance and exhibitions.’

34. Staff need support too. Our polling found that 47 per cent of teachers had no experience of digital teaching and learning at the beginning of lockdown in March 2020. While staff grew more confident as the pandemic progressed, we often heard that their digital skill level could be a barrier to successful teaching.

Harness technology effectively

35. We often heard that the pandemic had highlighted inadequacies in digital infrastructure and that greater investment was needed.
36. The best technology meets the real-world pedagogical needs of teachers and helps deliver improved learning. However, students and staff suggested to us that overly complex systems or using too many digital platforms can be counterproductive.
37. Where possible, platforms can be streamlined into a seamless digital environment for students and staff. Ideally, this should be combined with regular training and opportunities for students to build skills – as well as considerations of how accessible virtual platforms are to different student groups.
38. Several areas promise exciting developments, including augmented and virtual reality and data analytics. Capitalising on these opportunities needs collaboration between higher education providers and technology companies, meaningful consultation with staff and students, and a culture that is open to change.

Embed inclusion

39. While the flexibility of online learning can open up higher education to more students, there are risks, which may cause some to feel excluded from digital communities. It is critical that universities build inclusivity into their overall approach.

Advance HE

‘Whilst everyone is getting more used to communicating in an online environment, it is more challenging for an educator to “read the room” and pick up non-verbal cues that demonstrate understanding or misunderstanding; this has many potential consequences but can be particularly challenging for disabled students or across different cultures.’

40. The pandemic highlighted a number of benefits relating to inclusion, with broad agreement that some students who did not previously feel able to fully contribute are significantly more engaged. For example, chat functions enabled more questions than in-person settings.
41. There are three broad stages to embedding inclusion systematically:
 - **Review and evaluate** – engaging with different student groups and proactively seeking feedback are essential.
 - **Design inclusively** – those designing online platforms should have a clear understanding of the needs of teachers and different student groups.
 - **Adapt safeguarding practices** – there must be robust mechanisms to report and deal with online harassment and other forms of hate crime.

Plan strategically

42. High-quality digital teaching and learning requires significant investment, for example in staff training, buying equipment, staff time to develop resources, and updating old platforms. While substantive, these costs should be seen in the context of the potential benefits they bring. Done well, digital teaching and learning can improve learning outcomes, enhance student engagement and perceptions of value, and build resilience in the face of future shocks.

Recommendations

43. We have condensed the lessons from our review into a set of recommendations (explored fully on page 20) that we believe leads to high-quality digital teaching and learning. To help make these recommendations practical, we have drawn out six things we think every university or college leader should consider ahead of the 2021-22 academic year. The overarching recommendations, which we hope will remain relevant for years to come, follow this highly practical set of prompts to aid leaders as they approach the coming year.

Six actions for 2021-22

We have drawn out a checklist of six things we think every university or college leader should consider ahead of the 2021-22 academic year.

✓	1. Assess students' digital access on a one-to-one basis and address issues before learning is lost	<ul style="list-style-type: none">• How will you apply our definition of digital access to identify challenges for new and returning students?• What steps will you take to help students mitigate potential issues before they become a problem?• Have you considered a range of scenarios? Are your plans flexible enough to accommodate uncertainty about the extent to which digital delivery will be required?
✓	2. Inform students what digital skills they will need	<ul style="list-style-type: none">• Do students know what skills they will need before term starts?• Can they be directed to resources to develop them before starting their course?
✓	3. Involve students in designing teaching and learning	<ul style="list-style-type: none">• Do you have the mechanisms in place to involve students in any learning design for the coming year – planned or emergency?• Will students have regular opportunities to provide feedback on their digital learning experience?
✓	4. Equip staff with the right skills and resources	<ul style="list-style-type: none">• How will you engage with staff to understand their skills needs?• Do you have appropriate development mechanisms to make sure staff are well equipped for the new term?
✓	5. Make the digital environment safe for all students	<ul style="list-style-type: none">• Do you have clear and visible safeguarding mechanisms for your digital environments?• Do students know where they can report any form of harassment online?
✓	6. Plan how you will seize the opportunity for the longer-term	<ul style="list-style-type: none">• How can you reflect on the longer-term implications of everything you have achieved in the last year?• Have you made time to consider how you will apply the recommendations in this report to your own institution?

Table 2: Recommendations

Redesign pedagogy, curriculum and assessment
<ul style="list-style-type: none">• Design teaching and learning specifically for digital delivery using a 'pedagogy-first' approach.
<ul style="list-style-type: none">• Co-design digital teaching and learning with students at every point in the design process.
<ul style="list-style-type: none">• Seize the opportunity to reconsider how assessments align with intended learning outcomes.
Ensure digital access
<ul style="list-style-type: none">• Proactively assess students' digital access on an individual basis and develop personalised action plans to mitigate any issues identified.
<ul style="list-style-type: none">• Build learning and procure technology around the digital access actually available to students, not the access they would have in a perfect world.
Build digital skills
<ul style="list-style-type: none">• Communicate clearly to students the digital skills they need for their course, ideally before their course starts.
<ul style="list-style-type: none">• Create mechanisms that allow students to track their digital skills throughout their course and allow these skills to be recognised and showcased to employers.
<ul style="list-style-type: none">• Support staff to develop digital skills by incentivising excellence and continuous improvement.
Harness technology effectively
<ul style="list-style-type: none">• Streamline technology for digital teaching and learning and use it consistently as far as possible.
<ul style="list-style-type: none">• Involve students and staff in decisions about the digital infrastructure that will be used and how it will be implemented.
<ul style="list-style-type: none">• Foster a culture of openness to change and encourage calculated risk-taking.
Embed inclusion
<ul style="list-style-type: none">• Review and evaluate whether provision is inclusive and accessible.
<ul style="list-style-type: none">• Design inclusively, build a sense of belonging and complement this with tailored support for individual students.
<ul style="list-style-type: none">• Adapt safeguarding practices for the digital environment.
Plan strategically
<ul style="list-style-type: none">• Ensure a strong student voice informs every aspect of strategic planning.
<ul style="list-style-type: none">• Embed a commitment to high-quality digital teaching and learning in every part of the organisation.
<ul style="list-style-type: none">• Proactively reflect on the approach to the digital and physical campuses.

Introduction

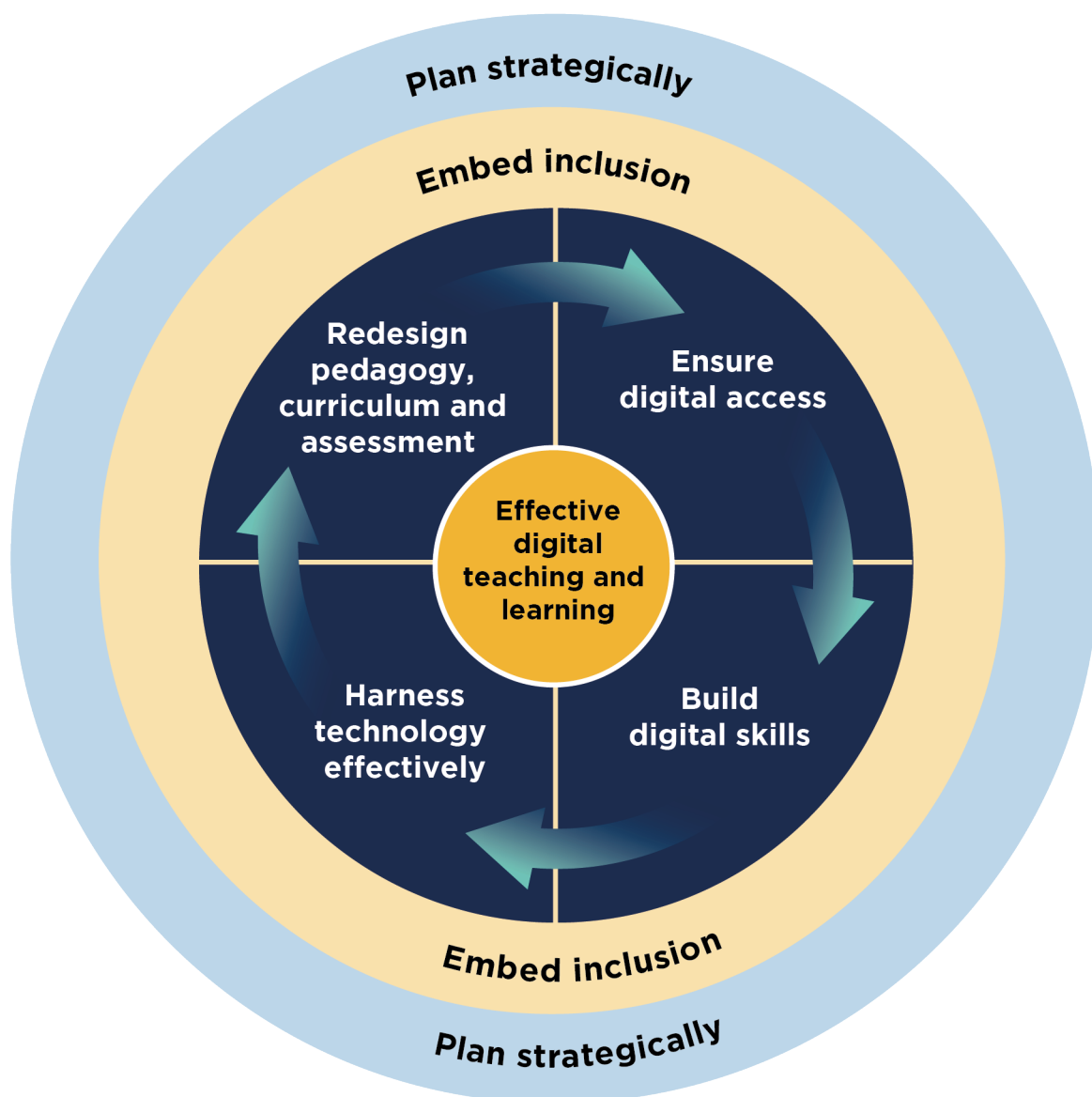
44. In the science of space and satellites, a ‘gravity assist’ is a technique that involves using a planet’s gravity to alter a spacecraft’s trajectory. As a spacecraft gets within a planet’s gravitational field, it ‘borrows’ some of the planet’s momentum to accelerate. This technique has been used by NASA to propel spacecraft to parts of the solar system that would otherwise have been impossible to reach.¹⁰
45. We hope that the lessons learned from the coronavirus (COVID-19) pandemic will have a similar effect. Instead of flinging telescopes to the outer reaches of our galaxy, we believe these lessons can help propel the English higher education sector in all its diversity to a better and brighter future. This report is our contribution to that gravity assist, putting digital teaching and learning in higher education on an accelerated trajectory.
46. When this review was commissioned by the Secretary of State for Education in June 2020, there had already been a wealth of shared learning from March up to that point for us to draw on, but we did not know how much longer it would be before coronavirus restrictions would change and in-person teaching and learning returned in a recognisable form. As restrictions have continued up to the time of writing this report, and look set to continue for at least the near future, the ‘mass trial’ of digital teaching and learning has been extended. At the time the polling commissioned for this report was carried out, 93 per cent of undergraduates were receiving all or mostly digital teaching and learning, and this was similar for postgraduate students (89 per cent).^{*} Digital teaching and learning is not new, but this is the first time it has been used so extensively and at such scale.
47. Over the past seven months, we have conducted research and have spoken extensively with a wide-ranging group of individuals who have witnessed or been part of this ‘mass trial’ in various ways. The circumstances of the past year have been immensely challenging and often frustrating for students, staff, and senior leaders. Despite this adversity, a striking theme of all our interactions was the shared enthusiasm for the opportunity to use this experience as a foundation for better use of digital teaching and learning in the longer term. We frequently heard comments along the lines of ‘we have made the changes we thought would take five years in five weeks’. The future remains uncertain, but we are optimistic about the opportunity it holds.
48. In the rapidly evolving and uncertain context of the pandemic, much of the implementation of digital teaching and learning was understandably far from perfect. For this reason, it can be helpful to distinguish between ‘emergency remote teaching and learning’ and digital teaching and learning.¹¹ In this report, we have distilled what we believe are the core components of successful digital teaching and learning, based on our research. Our recommendations have been written both with preparation for the next academic year in mind and as a guide to the most

^{*} This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

significant longer-term opportunities, when the external circumstances will be more stable. There is of course, always more to learn, and we hope that this report stimulates further dialogue and debate on how to maximise the boost of this gravity assist.

49. In chapter 1, we outline the benefits and strategic opportunities that digital teaching and learning presents. We reflect on how the experience of the pandemic has brought these benefits to light. In chapters 2 to 7, we examine each of the six core components of successful digital teaching and learning in turn. The report does not represent regulatory advice or guidance. Our focus is on the gravity assist: sharing what we have learned, supporting reflection, and prompting further action, research and exploration of the ideas presented.
50. When referring to 'students' in this report, we are referring to all students in higher education. This includes undergraduate and postgraduate students, part-time and full-time students, mature students, and students studying higher education courses in further education colleges.
51. In using the term 'digital teaching and learning', we are referring to a broad spectrum of approaches. This report does not argue that all higher education providers should move towards fully digital delivery of teaching and learning. For many higher education providers, an approach that combines both in-person and digital delivery may be the best fit. We argue that once they have identified where on that spectrum would be the best fit for their staff, students and stakeholders, they should draw on our six common components of successful digital teaching and learning (see figure 5).
52. The remainder of this introduction articulates how the core components interact to result in excellent digital teaching and learning, sets out our recommendations for how to achieve this, and defines some of the terms we use in the report.

Figure 5: The six components of successful digital teaching and learning



53. The starting point in our model is the redesign of pedagogy, curriculum and assessment (chapter 2). For digital teaching and learning to be effective, it must start with pedagogy. Designing a learning experience is on its own insufficient – what use is teaching without students who can benefit from it? Ensuring that students have access to the digital infrastructure appropriate for the learning experience is the other prerequisite for digital teaching and learning to take place at all (chapter 3).
54. Access then enables students and staff to build the digital skills they need to be able to engage with or design high-quality digital teaching and learning (chapter 4). Once pedagogy and learning materials, access, and digital skills are in place, we can start to harness the technology in a strategic way – rather than being ad hoc or reactive, a university or college can invest in a way that complements the first three

elements, driven by what best serves the needs of students and the pursuit of education (chapter 5).

55. Strategic utilisation of technology and the effective use of data will then inform further redesign of pedagogy, curriculum and assessment as newer technologies become available and existing technology choices are informed by evaluation and feedback from students and staff. This link completes a virtuous circle at the heart of our model.
56. We also argue that excellence requires embedding inclusion (chapter 6) and taking a strategic approach to the application of digital teaching and learning (chapter 7). Both these elements permeate and underpin the other core components.
57. Considerations of accessibility, flexibility and inclusion should be embedded in the design of learning experiences. Similarly, these considerations should inform approaches to digital access, digital skills, and decisions about the purpose, procurement and design of digital systems and tools – particularly given that students with certain protected characteristics, and from underrepresented backgrounds, are likely to be disproportionately affected by these issues.
58. Taking a strategic approach requires thinking about the interaction between all these core elements, applying consistently high standards, and embedding digital delivery and the accompanying data into institution-wide strategic planning. As we explain in chapter 7, ‘Plan strategically’, higher education providers that have been most successful in the transition have been those with a highly focused vision of success that is integrated across all levels of the institution. We advocate in particular for student partnership to form part of this strategic approach – and so run through the rest of the core components – to make sure digital teaching and learning is best able to meet the needs and aspirations of students.
59. Throughout the report we have drawn on YouGov polling of students and teaching staff, commissioned for this review and conducted in November 2020. Some questions relate to how the pandemic has changed attitudes to digital teaching and learning. For these questions, we have excluded some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online. In these cases, the excluded responses were on average more positive than the results we have shared, which we assume is a product of wanting to embark on a distance learning course in the first place. Where questions relate to overall attitudes to digital teaching and learning, we have included these responses. In every case, our approach is captured in footnotes on the page.

Recommendations

60. Tables 3 to 8 summarise our recommendations.¹² These suggestions are directed primarily at those working in higher education – both on the front line of teaching and in senior leadership positions. Together, they articulate a set of practical steps to help institutions implement the model of successful digital teaching and learning contained in this report.

61. We hope these recommendations have wider relevance to audiences beyond those who run our universities and colleges. We hope that students use these recommendations as a tool for framing their expectations and to insist on high standards from their institution. We hope technologists use them as a guide to where their innovations can do the greatest good for students and society. And we hope policymakers can use them as a framework for thinking about how their policy levers can further promote excellence in digital teaching and learning. This final group may find particular benefit in reflecting on how their interventions shape incentives or create barriers for providers pursuing our recommendations. For example, policymakers could consider the incentives created by the Teaching Excellence and Student Outcomes Framework and how it could further encourage adoption of this model of digital teaching and learning, or how existing funding mechanisms like challenge competitions might encourage evaluation and scale the most effective approaches.
62. For each recommendation, we have set out examples of positive and negative indicators.

Table 3: Recommendations to redesign pedagogy, curriculum and assessment

Recommendation	Positive indicators	Negative indicators
Design teaching and learning specifically for digital delivery using a ‘pedagogy-first’ approach.	<ul style="list-style-type: none"> Teaching and learning materials are designed for delivery in a digital environment. Pedagogy is placed at the centre of the design process, as opposed to this process being driven by technology. 	<ul style="list-style-type: none"> Teaching and learning materials are designed for in-person delivery and delivered without any modifications. Pedagogy is not driving the design of the digital teaching and learning. Often this is because technology takes primacy.
Co-design digital teaching and learning with students at every point in the design process.	<ul style="list-style-type: none"> Students are involved in the design of digital teaching and learning and are regularly asked for feedback. Digital teaching and learning is regularly updated and revised in light of student input and feedback. 	<ul style="list-style-type: none"> Students are not asked for feedback on the design of their digital teaching and learning. Digital teaching and learning is static and is not refined in light of student feedback.

<p>Seize the opportunity to reconsider how assessments align with intended learning outcomes.</p>	<ul style="list-style-type: none"> • Staff regularly reflect on how assessments are linked to intended learning outcomes. Where there is misalignment, this is addressed, and assessments are redesigned. • Senior leaders and teaching staff understand and use digital teaching and learning to create more 'authentic' assessments that focus on the application of acquired knowledge and skills. 	<ul style="list-style-type: none"> • Teaching staff do not reflect on whether assessments are aligned to intended learning outcomes. • Senior leaders and teaching staff are not open to exploring how digital assessments could take more 'authentic' forms.
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Table 4: Recommendations to ensure digital access

Recommendation	Positive indicators	Negative indicators
<p>Proactively assess students' digital access on an individual basis and develop personalised action plans to mitigate any issues identified.</p>	<ul style="list-style-type: none"> • Staff work with all students facing digital access challenges on a one-to-one basis to develop personalised action plans that will mitigate digital access challenges and where appropriate identify any additional support needs. The plans are regularly reviewed. • Students are informed about the digital equipment needed for the course well in advance of the start date, and this information is available to students at the time of choosing a course. • Higher education providers take every step possible to ensure 	<ul style="list-style-type: none"> • Higher education providers do not know how many students have digital access challenges, or which items of digital infrastructure they are missing. • Students are not given any information about the items of digital infrastructure they will need. If they are given information, this is given only once the course has started and there is limited time for the student to plan effectively. • No, or limited, action is taken to support students with digital access challenges.

	that no student is without access to digital teaching and learning because of digital access challenges.	
Build learning and procure technology around the digital access actually available to students, not the access they would have in a perfect world.	<ul style="list-style-type: none"> • Teaching staff design digital teaching and learning materials with digital access challenges in mind. • Digital teaching and learning is designed for students with lower bandwidths, and asynchronous alternatives are made available for students with limited or unreliable internet access. 	<ul style="list-style-type: none"> • Digital teaching and learning materials are designed without regard to students who have poor digital access. • Learning experiences are designed for users with higher specification hardware than most students have access to. • No alternative formats are offered for students with limited or unreliable internet access.

Table 5: Recommendations to build digital skills

Recommendation	Positive indicators	Negative indicators
Communicate clearly to students the digital skills they need for their course, ideally before their course starts.	<ul style="list-style-type: none"> • Students have a clear understanding of the digital skills they will need for their course and access to the resources they need to develop them. • Information about the digital skills students will need for their course is available in advance of the start date. 	<ul style="list-style-type: none"> • Students are given no information about the digital skills they will need for their course, or this information is only given once the course has started. • Students do not have access to resources that enable them to develop the digital skills they need.
Create mechanisms that allow students to track their digital skills throughout their course and allow these skills to be recognised and	<ul style="list-style-type: none"> • Students can track the digital skills they have developed throughout their course. This may be through digital passports or badges. 	<ul style="list-style-type: none"> • Students are not able to track the digital skills they develop. • Students struggle to communicate the digital

showcased to employers.	<ul style="list-style-type: none"> Students are skilled in communicating the digital skills they have developed to employers. 	skills they have developed to employers.
Support staff to develop digital skills by incentivising excellence and continuous improvement.	<ul style="list-style-type: none"> Excellence in digital teaching and learning is championed and those with particularly advanced knowledge and skills are given ways to share this across the organisation. Staff understand the digital skills they need and how their own abilities track against this (this may be through self-assessment). Staff are given regular opportunities to improve their digital skills and have a clear understanding of where to go to access training materials and resources. 	<ul style="list-style-type: none"> Excellence in digital teaching and learning is not recognised and there is not a culture of encouraging those with advanced knowledge and skills to share this across the organisation. Staff are unclear on the digital skills they need and are not clear on how their own abilities track against this. Staff are not given opportunities to improve their digital skills, or do not know how to access training materials and resources.

Table 6: Recommendations to harness technology effectively

Recommendation	Positive indicators	Negative indicators
Streamline technology for digital teaching and learning and use it consistently as far as possible.	<ul style="list-style-type: none"> Students and staff can easily access all resources they need for digital teaching and learning, and the need to switch between tools and platforms is limited. Staff across departments have a consistent approach to using tools and platforms, and this leads 	<ul style="list-style-type: none"> Students and staff feel overwhelmed by the wide range of tools and platforms they are asked to work with. There are wide disparities in the way that tools and platforms are used across different departments. Students do not have clear expectations about what they are expected

	<p>to students having clear expectations about what they are expected to use and how to use it.</p>	<p>to use or how they are expected to use it.</p>
<p>Involve students and staff in decisions about the technology that will be used and how it will be implemented.</p>	<ul style="list-style-type: none"> • Students, especially those with accessibility requirements, are leaders in the decision-making processes about the technology that will be used and how it will be implemented. • Teaching staff who will be delivering digital teaching and learning are also leaders in these decision-making processes. 	<ul style="list-style-type: none"> • Students and teaching staff do not provide input that informs decisions about the technology that will be used and how it will be implemented.
<p>Foster a culture of openness to change and encourage calculated risk-taking.</p>	<ul style="list-style-type: none"> • An agile approach is taken to the procurement of technology, with tools and platforms reviewed regularly to assess whether they are fit for purpose and whether any new approaches might need to be adopted. • Senior management teams (or those they rely on for advice) have a strong understanding of the tools and technologies available and the purposes they serve. 	<ul style="list-style-type: none"> • Senior management teams do not engage (or do not regularly engage) in discussions or decisions about the technology that is used. In some cases, this may stem from this being seen as solely the responsibility of IT teams.

Table 7: Recommendations to embed inclusion

Recommendation	Positive indicators	Negative indicators
<p>Review and evaluate whether provision is inclusive and accessible.</p>	<ul style="list-style-type: none"> • Students, in particular those from underrepresented groups, are able to give feedback on how inclusive and accessible their learning environment is. • Staff should feel equipped to use student feedback and other information to establish how inclusive the learning and teaching environment is, and empowered and enabled to make improvements. 	<ul style="list-style-type: none"> • Students are unable to give feedback on how inclusive or accessible their learning environment is. • A lack of expert insight or sharing of effective practice slows or prevents progress.
<p>Design inclusively, build a sense of belonging and complement this with tailored support for individual students.</p>	<ul style="list-style-type: none"> • Inclusive design is seen as the default for all digital teaching and learning. • Staff have the confidence and skills to embed inclusivity into the learning environment. • Individual students are given timely and tailored support where appropriate. • The needs and experiences of particular groups of students, particularly those from underrepresented 	<ul style="list-style-type: none"> • The importance of inclusive design is not recognised and this is not a standard feature of the design of digital teaching and learning. • Existing platforms, service-level agreements and procurement practices do not sufficiently consider accessibility requirements or inclusive design. • Accessibility considerations are limited or piecemeal, or not part of the process of designing, implementing and evaluating digital

	backgrounds, are considered.	teaching and learning at all.
Adapt safeguarding practices for the digital environment.	<ul style="list-style-type: none"> Effective safeguarding practices are in place and promoted, to tackle online abuse including harassment, racial hate, and sexual misconduct. 	<ul style="list-style-type: none"> The impact of digital learning and teaching environments is not sufficiently considered in safeguarding practices. Students and staff do not know how to seek help or raise safeguarding issues that occur online.

Table 8: Recommendations to plan strategically

Recommendation	Positive indicators	Negative indicators
Ensure a strong student voice informs every aspect of strategic planning.	<ul style="list-style-type: none"> Student voice and representation is embedded into all strategic decisions concerning digital teaching and learning. This should also be true of strategic planning processes in all areas. 	<ul style="list-style-type: none"> Students are not given any opportunity to provide input into strategic decisions concerning digital teaching and learning.
Embed a commitment to high-quality digital teaching and learning in every part of the organisation.	<ul style="list-style-type: none"> A commitment to high-quality digital teaching and learning is embedded in every part of the organisation and success in digital teaching and learning is seen as part of overall success. Senior management teams have a strong understanding of what high-quality digital teaching and learning looks like and what it takes to design and deliver this. 	<ul style="list-style-type: none"> There is significant inconsistency across teams and departments in the understanding that staff have about what high-quality digital teaching and learning consists of. There is significant inconsistency across teams and departments in the quality of digital teaching and learning that is designed and delivered. Senior management teams have a poor understanding of what

		high-quality digital teaching and learning looks like and what it takes to design and deliver this.
Proactively reflect on the approach to the digital and physical campuses.	<ul style="list-style-type: none"> • The importance of the digital campus is understood by senior management teams. • The balance of investment between the digital and physical campuses is actively considered and aligns with the long-term strategic direction of the organisation. 	<ul style="list-style-type: none"> • The digital campus is rarely discussed or considered as part of senior management team or discussions about the strategic direction of the organisation.

Terminology¹³

63. In this report we use several terms which overlap and intersect. The figure below establishes where these terms sit on a spectrum from in-person delivery to delivery in a digital environment.

Figure 6: terminology

In-person delivery	Combination of in-person delivery and delivery in a digital environment	Delivery in a digital environment
<p>In-person teaching and learning Teaching and learning activities whose participants are located in the same physical space and make limited or no use of a digital environment.</p>	<p>Blended learning Teaching and learning that combines in-person delivery and delivery in a digital environment. The balance of in-person delivery and delivery in a digital environment can vary widely and the term 'blended learning' is used to refer to a wide variety of models across the higher education sector.</p>	<p>Exclusively digital delivery All teaching and learning designed to be delivered in a digital environment.</p>
<p>Digital teaching and learning An umbrella term that we use in this report to refer to a broad spectrum of approaches, all of which use digital technology and are at least partly delivered in a digital environment.</p>		
<p>Emergency remote teaching and learning All teaching and learning is rapidly moved to delivery in a digital environment. There may be some redesign of teaching and learning for delivery in a digital environment but this is more limited than it would have been in a 'normal' context.</p>		
<p>Technology enhanced learning A broad term referring to the use of digital technology to supplement and support teaching and learning. This could be through in-person delivery or delivery in a digital environment (or a combination of the two). For example, the use of PowerPoint slides when giving an in-person lecture would be considered 'technology-enhanced learning'.</p>		

64. There is significant debate around the use of these terms, and variety in the way they are used across the higher education sector. Given the multiple definitions and interpretation, we offer further notes for the following terms:

- **'Delivery in a digital environment'**: We use this term in place of 'online' delivery, since – as the Quality Assurance Agency for Higher Education (QAA)'s 'Taxonomy for digital learning' (2020) explains – 'online' delivery implies internet

connectivity, and we are conscious that asynchronous digital learning activities will often be done without internet connectivity.¹⁴

- **‘Blended learning’:** We recognise that others have defined this term differently; for example, we welcome Dr Laurillard’s definition of blended learning, which focuses on the way learning is designed and the considered use of digital technology woven into course design from the outset.¹⁵ However, for the sake of consistency and clarity in this report, we have not defined the term in that way here and focused on mode of delivery.
- **‘In-person teaching and learning’:** In this report we use the term ‘in-person’ rather than ‘face-to-face’ to describe activities where participants are co-located in the same physical space. For example, a traditional lecture where students and staff are present in the same lecture hall at the same time would be ‘in person’. A one-to-one session between student and supervisor, where both parties meet in the same physical location on campus, would be ‘in person’. Although ‘face-to-face’ is the terminology often used to describe these types of activities, the use of video conferencing software, which has risen through the pandemic, has shown that individuals and groups can also meet face-to-face through a digital medium.

65. Readers may also find the following definitions useful as they navigate the report:

- **‘Asynchronous learning’:** ‘Learning that does not occur in the same place or at the same time for a whole cohort. Students can access resources and communicate at any time and are not restricted to accessing this learning at any specific time. Enables students to learn at their own pace in their own time.’¹⁶
- **‘Synchronous learning’:** ‘Learning that takes place with participants all engaging with material in real time, although not necessarily in the same place (for example, some students may participate onsite while others may participate remotely, both at the same time).’¹⁷
- **‘Flipped learning’:** A model of teaching and learning in which students review asynchronous materials ahead of the class, and then classes are used to deepen understanding of the materials through synchronous activities such as group discussion or problem solving.
- **‘Technology enhanced learning’:** A broad term referring to the use of digital technology to supplement and support teaching and learning. This could be through in-person delivery or delivery in a digital environment (or a combination of the two).¹⁸ For example, the use of PowerPoint slides when giving an in-person lecture would be considered ‘technology enhanced learning’.

Chapter 1: What are the benefits of digital teaching and learning?

66. Although the experience of rapidly moving online was at times fraught, those engaging with the review were generally positive about the potential benefits that digital teaching and learning can generate. Despite the challenges of the pandemic, most students also recognise that there are potential benefits to the further development of digital teaching and learning: in polling conducted for this review, 63 per cent of students stated that they would like at least some online delivery to continue.[†] In this section of the report, we set out the positives digital teaching and learning can offer, beyond being a mere stopgap during a pandemic.

What is digital teaching and learning?

67. As outlined in our notes on terminology, we use ‘digital teaching and learning’ as an umbrella term to describe teaching and learning that is delivered using digital technology and involves some element of delivery in a digital environment. Within the spectrum that ‘digital teaching and learning’ covers, there may be courses that are delivered predominantly through in-person methods enhanced by asynchronous digital activities such as short videos or quizzes. Other courses may have a mix of learning activities that encourage learners to interact and co-create through digital means synchronously, alongside pre-prepared digital activities and in-person sessions. The specific blend of in-person and digital delivery can be tailored to suit subject requirements and the learning needs of students.
68. Throughout our review we were told with excitement about the ways in which a digital approach to learning and teaching had had a positive impact. The positive impacts most cited through the review’s call for evidence and in interviews fell into five categories: increased flexibility, personalised learning, increased career prospects, pedagogical opportunities and global opportunities.

Table 9: Positive impacts of digital learning and teaching

Category	Examples
Increased flexibility	<ul style="list-style-type: none">• Staff and students aren’t bound by a physical campus, meaning staff can teach their specialism from any location and students can learn in an environment that suits their needs best.• Students can learn at their own pace and still access support where needed.• In the longer term, there is potential for savings on staff time through the use of pre-recorded material or education technology tools that support assessment, creating more time

[†] This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

	<p>for staff to engage students in discussion-based activities or mentoring support.</p> <ul style="list-style-type: none"> • There are opportunities for more inclusive practice and to improve the experience for student groups who are traditionally underrepresented in higher education, such as student parents, commuter students, and disabled students.
Personalised learning	<ul style="list-style-type: none"> • Digital teaching and learning can offer more diverse options for course design. Students can be co-creators of learning content and choose from a variety of digital media for assessment. • Some education technology tools enable personalised assessment tasks to be set at the right level of challenge for individual students. • Education technology tools can also give students access to instant personalised feedback on submitted work or answers to pre-set questions. • Learning analytics software tools can help students visualise how they are engaging with their studies and how they are progressing in relation their peers. • Digital methods offer instant access to learning content - teachers can select precisely tailored materials in the moment. • Digital teaching and learning offers students multiple ways of engaging with their peers and course leaders to contribute and ask questions.
Increased career prospects	<ul style="list-style-type: none"> • Increased digital skills among students leave them better prepared for their future careers or studies. • Digital peer-to-peer learning more closely emulates learning in some workplaces, preparing students for learning beyond the traditional classroom. • Digital methods of delivery can reach potential students who would have been unlikely to attend a physical college or university. • Students can become strong, self-directed learners.
Pedagogical opportunities	<ul style="list-style-type: none"> • Digital technology can enable educators to do more. For instance, computers can simulate an experiment many times over and, by varying the parameters slightly each time, allow for multiple video perspectives on the same event in real time. Augmented reality (AR) and virtual reality (VR) can replicate

and go beyond real-life situations, all of which create pedagogical options not available without digital approaches.

- AR and VR technologies have the potential to transform teaching and learning that involves interaction with objects or specialist equipment, for example in medicine or laboratory-based learning for science and engineering.
- Voting platforms allow teachers to test student knowledge anonymously, live during lessons, enabling real-time data to inform progress towards learning outcomes and identify knowledge gaps.
- Artificial intelligence tools can offer personalised and adaptive learning that provides learners with tailored feedback and recommendations on how to improve.
- Digital approaches are not limited by physical space, so offer opportunities to extend the virtual campus to a global one – faculty members can be anywhere, and so can students.
- Digital learning material can be offered in multiple languages from the same university.¹⁹
- Students can access high-quality learning from global subject leaders from their home country.

Digital flexibility and labour market needs

69. In 2002, the United Nations Educational, Scientific and Cultural Organisation (UNESCO)'s Assistant Director-General for Education, John Daniel, acknowledged that open and distance learning was 'fast becoming an accepted and indispensable part of the mainstream of educational systems in both developed and developing countries'. He noted that this growth had been stimulated by the recognition that traditional ways of organising education need to be reinforced by innovative methods, if a fundamental right of all people to learn was to be realised.²⁰
70. Advances in technology have transformed the ability to learn at a distance. Digital technologies mean that the process of delivering distance learning can happen at a faster pace and with peers, and digital communities between tutors and peers create rich environments in which to learn and offer support remotely.
71. There has been a longstanding recognition of the opportunities that digital teaching and learning might bring for the UK higher education sector, its students, and the economy.²¹ Flexibility for learners to choose how and when they learn is often cited as a benefit, particularly for those who need to balance caring or work responsibilities around study. Learning by technology can provide enticing hooks

for some learners who find more traditional or classroom-based learning disengaging.²²

72. A report by the World Economic Forum noted that the current education model is designed for the needs of the first and second industrial revolutions, focused on direct learning to gain jobs in process-orientated professions. This study found that traditional education models are not perceived to teach the skills needed for innovation and to drive a prosperous economy.²³ In future, today's pupils may be employed in roles that do not exist yet, and it is highly likely that strong digital and social-emotional skills will be needed to thrive.
73. Research by UNESCO also notes the increasing need for upskilling and re-skilling in response to rapidly changing labour markets.²⁴ Graduates need opportunities to develop digital skills to be ready to engage in an ever-increasingly digital workplace, and those already in employment need flexible opportunities to learn at a distance.
74. Polling carried out in October 2020 by Universities UK found that 82 per cent of prospective students in England who are either unemployed, at risk of unemployment, or looking to learn new skills would be keen to study individual modules of a university degree.²⁵ Digitally delivered short courses to support upskilling and re-skilling of those in employment are available through organisations such as GetSmarter,²⁶ which partners with universities around the world to offer certified courses.
75. The potential to offer individual modules to support upskilling and retraining could be transformed through a shift to a more blended delivery of degree programmes. Offering modules digitally as part of a wider blended full degree programme could also provide flexibility for full-time and campus-based students.

Professor Iain Martin, Vice-Chancellor, Deakin University (Australia)

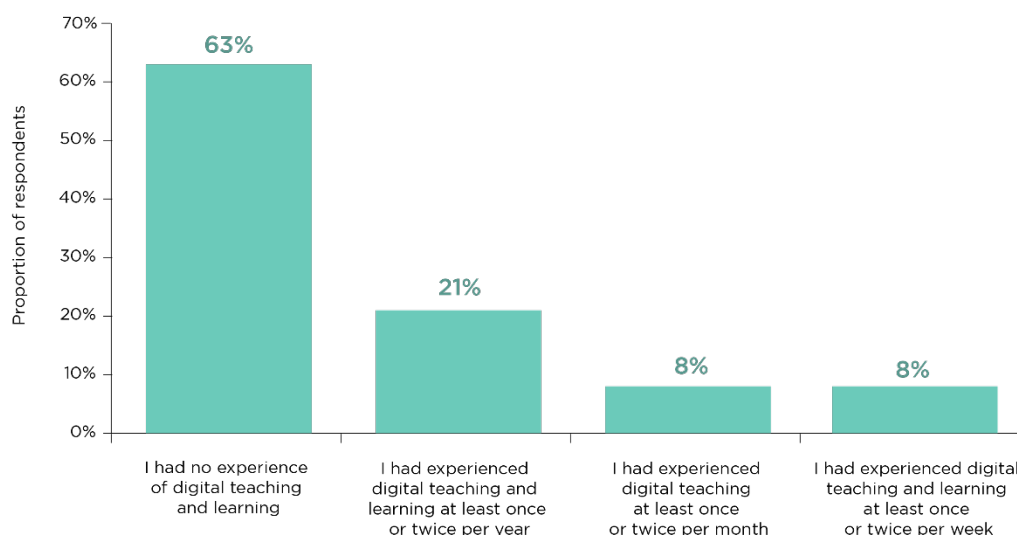
'Digital delivery will be the norm as the world moves to blending digital work and life with place based activities. A blended approach reflects how modern society operates more widely, and the flexibility to choose how, where and when to engage with learning is something that students are starting to expect as routine.'

76. A recent report by Jisc also highlights universities' role in upskilling, and points to the potential for universities to create a more modular framework for higher education, allowing for more flexible learning, which could be enabled by digital.²⁷ Currently part-time students need to take on at least 25 per cent of the work of a full-time student to be eligible for government funding. Studying alongside work, in smaller modular chunks, could open up possibilities for learning opportunities, allowing learners to continue to earn while studying, and could play an important role in current government ambitions for lifelong learning opportunities.²⁸

Rising appetites for digital delivery

77. Although the current higher education system offers great diversity in terms of provider and course types, OfS statistics show that students wanting to study part-time or by distance learning have fewer providers to choose from in their subject area than full-time students.²⁹ Despite diversity in the English higher education system, there was still a heavy reliance on traditional in-person methods of teaching before the pandemic began. Polling conducted for this report found that 47 per cent of teaching staff and 63 per cent of students surveyed had no experience of digital teaching and learning prior to March 2020.[‡]

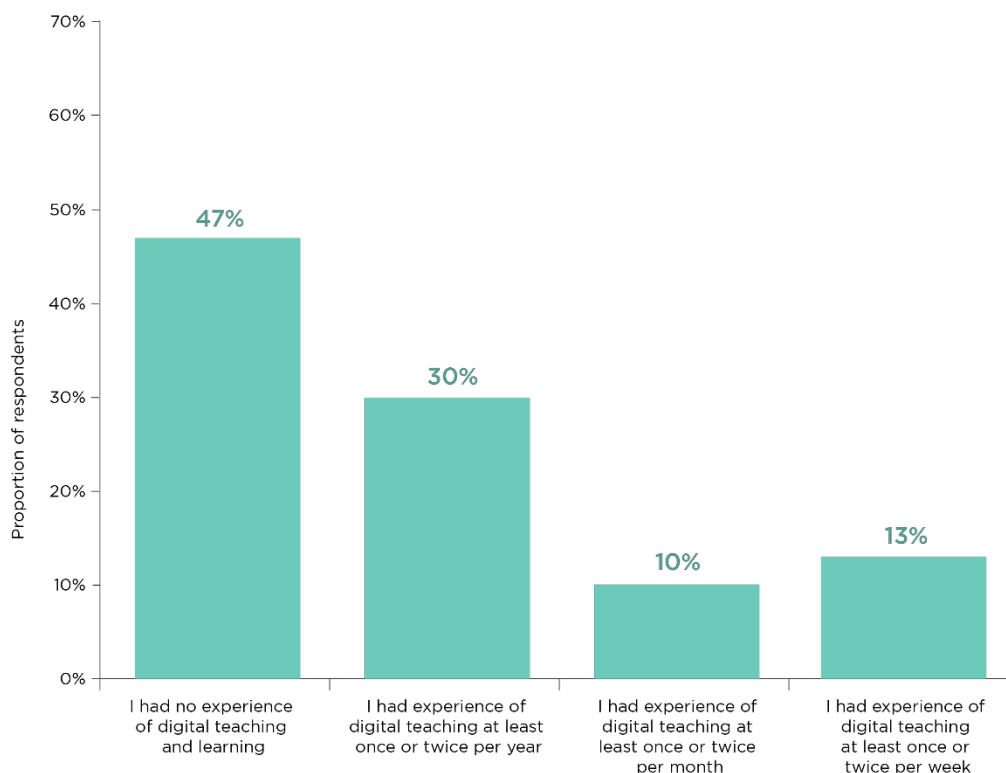
Figure 7: Which statement, if any, best applies to your experience of digital learning before the outbreak of COVID-19 (before March 2020)? (students)



Note: Source of data is YouGov polling conducted for this review. This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

[‡] This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Figure 8: Which statement, if any, best applies to your experience of digital teaching and learning before the outbreak of Covid-19 (before March 2020)? (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

78. Restrictions imposed in response to the pandemic in March 2020 forced universities and colleges around the world to move increasingly to remote teaching and learning. During the first three weeks of May 2020, 200 university leaders were surveyed from 53 jurisdictions, with the majority of responses coming from the US, China, the UK and Japan.³⁰ While much of the focus was on the immediate switch to online and the upcoming academic year, the longer-term questions suggested that the lockdown adjustments had effected lasting change. Overall, 55 per cent agreed that the experience of mass online teaching and the realisation of its possibilities would increase the use of fully online degrees at their institutions over the next five years, with 23 per cent disagreeing and the remaining 20 per cent neutral.
79. Evidence suggests there is a desire across the higher education ecosystem to capitalise on opportunities offered by digital teaching and learning. In the polling conducted for this report:
- The majority of teaching staff (70 per cent) agreed that digital teaching and learning provides opportunities teach students in new and exciting ways.
 - 51 per cent of teaching staff said they would like to continue delivering digital teaching and learning for the long term (despite 47 per cent having had no

experience of delivering digital teaching and learning before the coronavirus pandemic).

- 61 per cent of students said they would like their assessments to be delivered online or through a combination of online and in-person delivery.[§]

80. In interviews and in response to our call for evidence, university leaders commented that their teaching was unlikely to return to pre-pandemic times and that they were reconsidering how to adapt learning content for a digital and blended delivery. This sentiment is also supported in a report by Jisc, which found that ‘digital shift will not be rolled back and leaders want to build on successes in creativity and innovation to rethink the longer-term delivery of learning and teaching.’³¹
81. Alongside the shift in attitudes towards more blended and digitally focused methods of delivery, there has also been a recognition of the workforce challenge ahead: to ensure ‘that staff are recruited and developed with the right digital skills to sustain high-quality digital teaching and learning environments as practice continues to develop and new technologies become available’ (see chapter 4, ‘Build digital skills’).³²
82. The speed at which the shift to remote emergency teaching and learning took place has also meant that the needs of some student groups have not been considered as fully as they could have been. In response to our call for evidence, the Disabled Students’ Commission,³³ an independent and strategic group that advises higher education providers on improving support for disabled students, reported that:
 - Students with visual or hearing impairments faced severe challenges engaging with learning.
 - Students who relied on assistive technology struggled with compatibility issues.
 - There was a distinct lack of learning materials in accessible digital formats.
83. Although the initial switch to emergency remote teaching and learning has created a new set of challenges, such as those highlighted by the Disabled Students’ Commission (see chapter 6, ‘Embed inclusion’), there is real potential for digital delivery to revolutionise the learning experience for disabled students. For example, the potential to offer learning material in a variety of digital formats means learners can choose the format that suits their needs best, such as an audio file for text-based content, or those that integrate best with assistive technologies. Placing a greater weight on pre-class preparation and the flexibility to revisit content at their own pace will also benefit students who find traditional in-person learning environments more challenging to engage with.
84. A survey of international student recruitment teams early in the pandemic highlighted that the majority of universities were confident in their online postgraduate offer. Although one of the main concerns cited was market demand,

[§] This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

69 per cent thought it likely they would increase the proportion of postgraduate taught courses that were online as a result of the pandemic. In addition, 57 per cent agreed that their university planned to spend more money on online education.³⁴ Sir Steve Smith, the government's International Education Champion, noted that the 'potential for growth is huge' if the sector collectively maintains the UK's global reputation for high quality by engaging with what users want.

Global opportunities

85. The switch to digital delivery has given the vast majority of education providers around the world first-hand experience of learning and teaching in a digital environment and made connecting virtually the norm for many. This offers opportunity to extend the reach of UK higher education through new partnerships overseas, particularly in countries where digital learning was previously perceived to be of lower quality. The benefits of partnering digitally overseas could range from students interacting on joint projects to co-creation of learning at programme level. The increase in awareness and reputation of digital teaching and learning during the pandemic has also provided a stimulus for more conversations between existing transnational partners to explore how best to deliver the curriculum and bring international perspectives into its design.
86. Building on lessons learned through the pandemic and the move to more blended or wholly digital provision for transnational courses could, in some cases, remove the need for staff to fly overseas to teach in person, reducing provider's carbon footprints. Re-evaluating how UK higher education can be delivered through digital means overseas also has the potential to create more resilience for providers and to reach student groups overseas who currently cannot access a UK education from their home country.
87. A recent report published by Universities UK International focuses on how to build the global reputation and delivery of the UK's transnational online higher education.³⁵ The main barriers it cites to developing transnational online higher education relate to limited understanding of the transnational student experience and student outcomes (particularly employability), surface-level perceptions of the low quality of digital learning, the digital divide (access to appropriate technology), and taxation of digital transactions. The report also makes a series of recommendations aimed at improving recognition and communication around the quality of digital learning with overseas partners, capturing and communicating data on student outcomes, and sharing information on cross-border issues and software implications for overseas access.

Case study: University of Liverpool

The University of Liverpool formed a partnership with Xi'an Jiaotong University in 2006. All degree programmes are taught in English and Xi'an Jiaotong University is accredited by the University of Liverpool. Most undergraduate students have the option of spending their third and fourth years of study at Liverpool, and all undergraduates receive a dual award.

The partnership has led to several benefits for both partner institutions throughout the pandemic. For example, Xi'an Jiaotong University has shared good practice across both institutions using a series of podcasts for teaching staff. The move to digital delivery has also provided greater flexibility around student start dates, with some students arriving midway through semester 1 and others expected in semester 2.

Some challenges remain with online transnational education, such as interaction between students, meeting the requirements of accrediting bodies, and assessment. There are also technical challenges around livestreaming, reliability of internet connections, student's access to hardware and software, and firewalls.

Improvements in the infrastructure for digital teaching and learning have already helped the transnational education partnership and will continue to do so in the longer term. The University of Liverpool also envisages more opportunities for internationally accessible short courses and professional development provision.

Impact on research

88. While the impact on academic research and research community is beyond the immediate scope of this report, it is clear there has been a similar process of radical changes to ways of working – some of which will remain for the longer term – within academic research.
89. There have been several benefits from the shift to online that seem likely to alter the shape of research permanently. For example, attendance at conferences has increased as these have been moved to digital delivery. The shift has allowed researchers with caring responsibilities, teaching responsibilities, or limited funding to travel, to engage with international experts in their field when it would not have been possible otherwise.³⁶ There are also environmental benefits to holding conferences online and removing the need for international travel, and there are now efforts to explore whether carbon-neutral conferences would be possible.³⁷
90. On the other hand, the pandemic has presented several challenges for the research community. Academic researchers whose work can only be conducted in person, such as those doing certain types of laboratory work or research that requires access to original sources in libraries, have been severely restricted throughout the pandemic. As in many sectors of the economy, the work of academic researchers with caring responsibilities has also been affected by the closure of schools throughout the period. And for all the benefits of online conferences, anecdotally

we have heard several academics suggest that there is often room for improvement in their implementation.

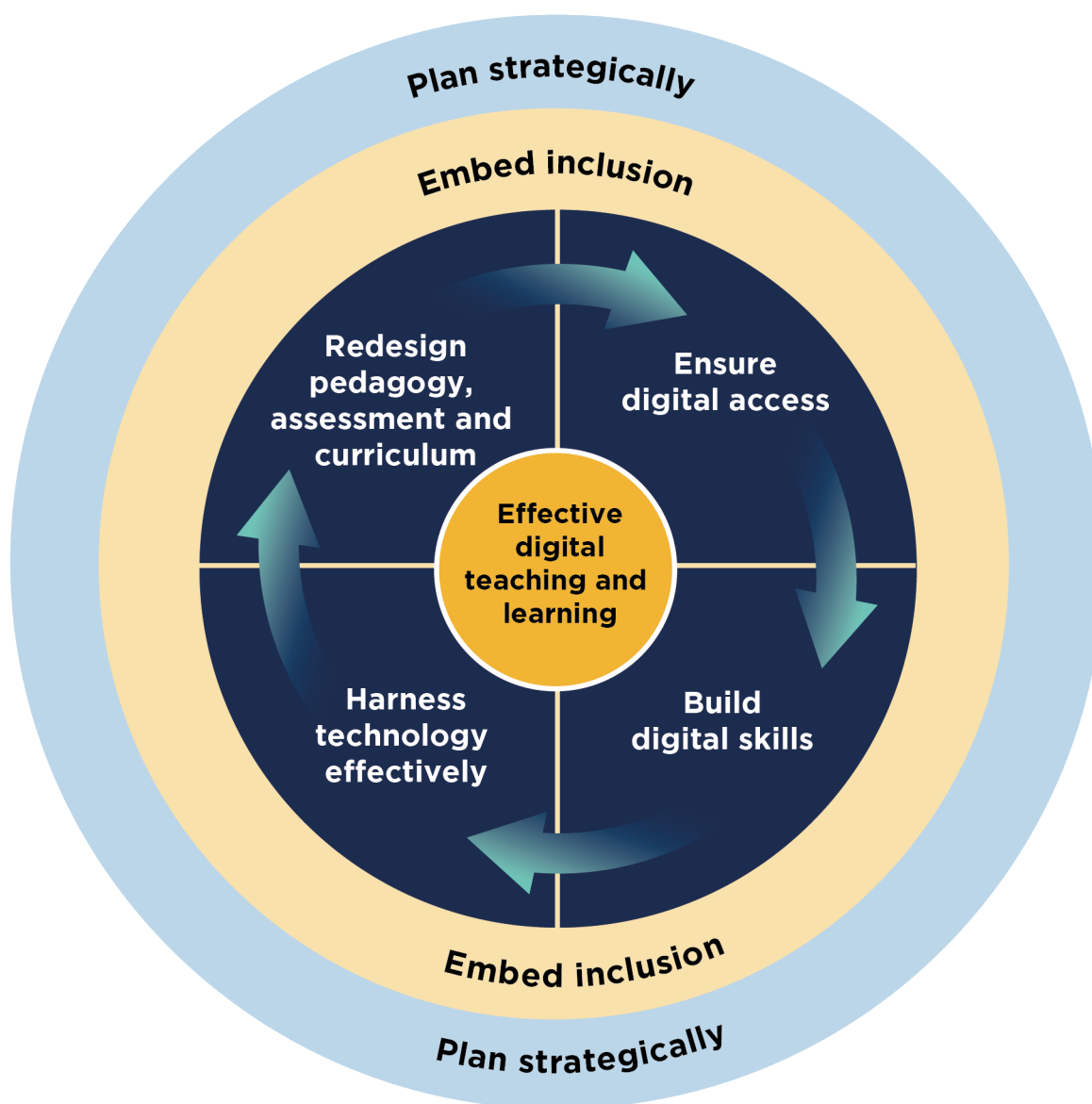
Challenges and limitations

91. While there are numerous opportunities and rewards to be reaped from digital teaching and learning, there are also potential challenges and limitations, which go beyond the difficulties caused by operating during a pandemic.
92. The potential value of digital teaching and learning differs by subject and some disciplines will be more reliant on in-person delivery out of necessity. Elements of vocational and practical courses such as archaeology, performing arts, textiles and physiotherapy cannot be replicated in a digital environment, and the intention of this report is not to imply that they should be. However, as discussed at greater length in chapter 4, 'Build digital skills', teaching staff in some practical subjects have been surprised by the possibilities available to enhance the teaching of these subjects using technology.
93. Relatedly, some providers may have a subject mix less suited to digital. We heard some further education colleges, for example, cite their technical focus as barrier to adoption. While true, this is not to say that digital teaching and learning is not appropriate for these providers. Rather, the specific form and implementation needs to be tailored to their size, circumstance and budget.
94. For some, digital teaching and learning is not appealing because the lack of in-person interaction with fellow students and teaching staff can make the experience demotivating and isolating. Many students (through interviews and polling conducted for this review) told us that they missed the absence of informal aspects of teaching and learning, such as the chance to ask teaching staff questions after a lecture or to connect more easily with others in their peer group.
95. Some teaching staff perceive the learning that students develop from digital teaching and learning to be weaker relative to in person teaching and learning. In a recent Times Higher Education survey, more university staff disagreed with the statement that online teaching results in stronger learning than traditional teaching: 35 per cent disagreed compared with 23 per cent who agreed, while 42 per cent were unsure.³⁸
96. There are also risks associated with greater use of technology. Although this is not the subject of this report, many forms of digital teaching and learning come with a heightened risk of cybersecurity attacks. Jisc has recently recommended that universities and colleges should invest substantively to mitigate these risks.³⁹

What to do to unlock these benefits

97. Having set out the prize that digital teaching and learning could represent, in chapters 2 to 7 we explore each of the core components described in the introduction that we think are necessary to seize the opportunity. The six sections that follow are based on the successive stages of the model in Figure 5. For every component of this model, we outline the primary lessons learned during the pandemic, as well as the longer-term opportunities. We conclude each section by summarising our recommendations for driving forward success.

Figure 5: The six components of successful digital teaching and learning



Chapter 2: Redesign pedagogy, curriculum, and assessment

98. There are several studies which compare in-person, online, and blended courses to determine which approach yields the best outcomes. While the results are mixed, large-scale studies have found little evidence to suggest that outcomes based on modality differ significantly.⁴⁰ In fact, some emerging evidence suggests slightly better outcomes for blended learning in particular circumstances.⁴¹
99. These findings support the important point that the effectiveness and value of a course are based on the approach to the design and the quality of teaching rather than its mode of delivery.⁴² In the face of the pandemic, many higher education providers have had to rethink their whole approach to teaching, the way they design teaching and learning and how they assess students. In this section, we explore the lessons learned as part of that exercise, and outline how redesigned pedagogy, curriculum, and assessment contribute to successful digital teaching and learning.

Pedagogy

100. 'Pedagogy' refers to the theory and practice of teaching or, in other words, 'how teachers teach'. The shift to emergency remote teaching and learning caused many teaching staff to think through the pedagogy of their teaching, to adapt to remote learning in a way that they might not have done for several years. The use of different digital platforms, combined with in-person teaching, opens up exciting opportunities to accelerate pedagogical developments for digital teaching and learning.

Lessons learned

When designing digital teaching and learning, educators should focus on how students learn and adopt a 'pedagogy-first' approach.

101. We heard consistently that in approaching digital learning there must be a strong focus on how students learn. Technology cannot just be bolted onto an existing set of teaching materials. This principle was highlighted in our interviews with experts and in studies exploring opportunities for digital technology for learning, which stress the importance of pedagogy driving all digital teaching and learning, as opposed to being driven by digital technology.⁴³
102. This is sometimes referred to as a 'pedagogy-first' approach, which refers to 'development of digital learning in which the pedagogical approaches to be taken in the delivery of the programme are placed at the forefront and regarded as a key driver in the programme development and design process.'⁴⁴

Simon Thomson, Director of Centre for Innovation in Education, University of Liverpool

‘In terms of curriculum design, at an institutional level this can be based around a set of pedagogical principles and values to which all courses are aligned, whilst at the same time maintaining some local flexibility. In terms of technology, we need departments to think about “digital” in the context of their discipline areas – there needs to be a better understanding about localising effective technology use.’

Redesign – do not replicate

103. We heard that to create high-quality digital teaching and learning, it is important not simply to replicate what happens in an in-person setting or transpose materials designed for in-person delivery to a digital environment. For example, an hour-long in-person lecture should not simply be recorded; rather, it needs to be broken down into more manageable chunks. In other words, teachers need to reconsider how they approach teaching in a digital environment.

Emily Casey, Student Union President, Bath Spa University

‘The students I’ve worked with say their lecturers often recreate material they would have delivered face to face. That generates a negative perception of digital learning and it underlies the importance of new pedagogy emerging around these digital tools, but in speaking to academics, there is a lack of clarity as to what this pedagogy would look like. They fear technology being prioritised over pedagogy.’

Joanna MacDonnell, Director of Education and Students, University of Brighton

‘The blended learning delivery model has provided the opportunity to begin to design out traditional long monologue lectures, through emphasising the “chunking up” of delivered content in pre-recorded and live MS Teams lectures, and through face-to-face sessions being dedicated to practical work, seminars and small group teaching.’

Digital supports an active learning approach

Phil Gravestock, Dean of College of Learning and Teaching, University of Wolverhampton

‘For some courses, where it is appropriate, this may lead to a greater use of “flipped learning” approaches, so that the times when students are on campus and in a face-to-face environment with their tutors and peers can be used in an interactive way, rather than as a way in which didactic delivery of content can be provided.’

104. We also heard that one of the advantages of digital teaching and learning, which is increasingly recognised by higher education providers, is that it is well suited to ‘active learning’. ‘Active learning’ refers to an approach to learning that emphasises students’ direct engagement with the content being taught through activities such as problem solving or group discussions.
105. Some research has viewed active learning as a fundamental part of blended learning, and of what it means to redesign learning for delivery of at least some teaching and learning in a digital environment. For example, one study argued that: ‘blended learning should be approached as a fundamental redesign of the instructional model with the following characteristics: (1) A shift from lecture-centred to student-centred instruction in which students become active and interactive learners; (2) Increase in interaction between student-instructor, student-student, student-content, and student-outside resources; (3) Integrated formative and summative assessment mechanisms for students and instructors.’⁴⁵

Case study: University of Leeds

In response to coronavirus, the University of Leeds created a set of student education delivery principles⁴⁶ based on a vision of providing a student-centred active learning approach to deliver high-quality research-based education. This hybrid learning model places students at the centre of their learning experience, ensuring programmes are supportive, inclusive, flexible and community-focused. A staff and student working group was established to create the principles, which have been successfully used across the university to inform delivery of teaching and learning.

Active learning is a central element of the approach, to ensure that students are cognitively engaged, are provided with rich and diverse digital learning materials in multiple, accessible formats, and have opportunities to collaborate and participate in their own education.

‘The University is working hard to support staff and students and will continue to improve its online offer in line with feedback and informed by our strategic vision for digital transformation and excellence in student education. We used the Jisc

Digital Student Experience Survey to help us understand what we're doing well and where we needed to improve. The results gathered from around 4,500 taught [undergraduate] and [postgraduate] students showed some real positives, as well as areas for improvement. The majority of students polled told us that the overall quality of our hybrid learning was above average.

'The ability to review and consolidate best practice, to examine "what works" and "what can be improved" through staff and student-led dialogue, is the key to our successful "Leeds Partnership",⁴⁷ which has enabled a strong and productive working relationship between staff and students throughout the global pandemic.'

Case study: Nanyang Technological University Lee Kong Chian School of Medicine (Singapore)

Nanyang Technological University has used learning analytics to enhance its delivery of 'Teams-Based Learning' (a 'group-based active learning method'). To support Teams-Based Learning, the university has built a circular learning studio that can accommodate over 250 people and has multiple round tables to facilitate group working. Each table has a microphone at the centre that can be used to communicate with teaching staff and with other teams. Students can also wirelessly project relevant information to large projection screens which are hung around the room.

Teaching staff can access real-time learning analytics data that allows them to see both individual student and team performance, identify knowledge gaps that apply across the whole class, and then tailor their teaching to address these knowledge gaps during the class.

Opportunities

Providers and teaching staff need to engage proactively with emerging pedagogies in a digital learning environment.

106. The responses to our call for evidence demonstrated how the pandemic has accelerated approaches to enhancing the quality of digital environments and pedagogies that will bring long-term benefits. In some cases, however, staff were unaware of the potential of new pedagogical approaches in a digital environment. It is important that as digital teaching and learning and blended delivery become more common and integrated into higher education, teaching staff are clear on the principles of high-quality digital teaching and learning. Training and sharing of effective approaches, both within providers and across the sector so that teaching staff understand what that looks like, will play an important role.

Curriculum and course design

107. Focusing on learning outcomes and the student experience should guide the development of any course. Designing for delivery in a digital environment has provided an opportunity for many higher education providers to review their curriculum design and consider in detail how teaching and learning activities mapped across to learning outcomes.

Lessons learned

Designing high-quality, activity-orientated digital learning and content is resource-intensive.

108. We have heard consistently that designing high-quality, activity-orientated digital learning has a high cost in terms of time required to develop learning activities and to engage with relevant training. In our call for evidence, many reflected that it was time consuming to prepare resources and ensure all content was reviewed and put through a quality assurance process. Digital teaching and learning experts also emphasised that digital content requires iterative and continual review. It is important that leadership understands the resources required to create and maintain this content.

Co-design digital teaching and learning with students at every point in the design process.

109. Around half of students responding to our polling reported that they were asked for feedback on the digital teaching they have received from the start of the academic year 2020-21, and around half reported they were not asked for feedback. Fewer postgraduate (37 per cent) than undergraduate (57 per cent) students appear to have been asked for feedback.**
110. Independent government reports in 2013 and 2015 emphasised the importance of co-creation of digital teaching and learning with learners.⁴⁸ Co-design with students has been cited by experts and students as a valuable means of ensuring that teaching and learning is student-centred and engaging. Co-design with students does not mean that input should simply be sought at the start and end of delivering a course. It needs to be ongoing so that it can facilitate an iterative process of continual improvement and development. Training may need to be in place to support teaching staff to co-design with students and there will need to be recognition from senior management that this process can be resource intensive (see chapter 7, 'Plan strategically').

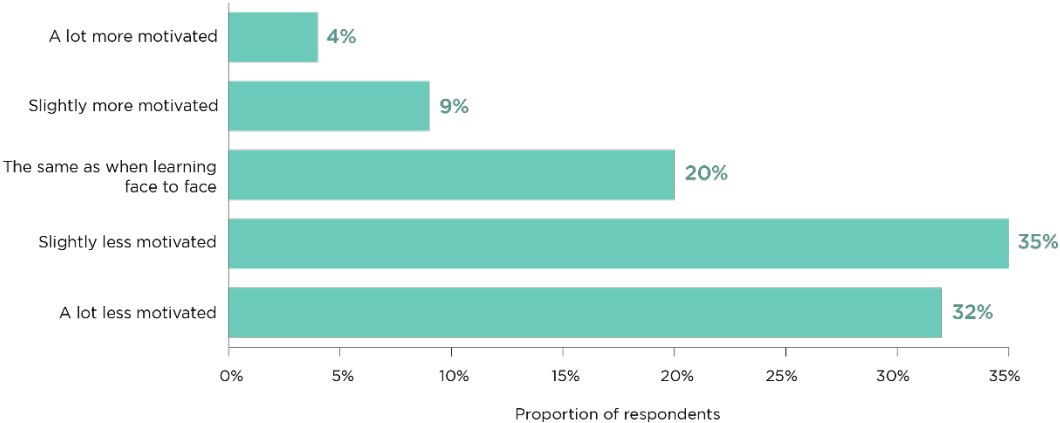
** This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Teaching staff (via call for evidence)

‘Understanding the nature of blended learning for me was a “penny dropping” moment. I realised that whilst we thought we were providing interactive training, actually we were still adhering very much to the old model of providing information one way and presenting to students rather than including them in the process.’

- 111. Student input is vital both to address student concerns and to understand what works well. According to Jisc’s 2021 student digital experience insights survey, 55 per cent of higher education students and 58 per cent of further education students agreed that their learning materials were well designed, whereas 36 per cent of higher education students and 41 per cent of further education students felt that their learning materials were engaging and motivating.⁴⁹ While we collected fewer responses from older students, the limited data we hold suggests that the move to digital teaching and learning had a greater impact on younger students. 70 per cent of 18- to 24-year-olds reported themselves to be less motivated, compared with 55 per cent of students over 35.^{††}

Figure 9: How motivated to study have you felt when learning online compared to learning face to face? (students)



Note: Source of data is YouGov polling conducted for this review. This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

†† This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Case study: Basingstoke College of Technology

Basingstoke College of Technology has developed a ‘student digital leaders’ programme that enables students to be co-creators of the design and support of digital teaching and learning at the college. The student digital leaders start as volunteers alongside the in-house digital team (themselves former student digital leaders), and many of them have graduated to become apprentices, technologists and facilitators at the college.

Having students involved in the design process has helped to ensure that design and format fits the needs of students. These student digital leaders have also been involved in the delivery of a ‘flipped learning hour’ that has integrated one hour of timetabled blended learning into all courses over the last five years.

Over the long term, Basingstoke College of Technology plans to bring people from local industry into the college to co-design alongside the in-house digital team.

Designing and building virtual communities and networks is an important part of course design.

112. Relationships between students and between students and teaching staff are important for learning. When learning is delivered in person, these networks develop more organically for some students and we heard several examples of the ease with which connections were created in and around the lecture theatres. In a digital learning environment, these peer and teaching staff networks need to be designed and built proactively.⁵⁰

Group sizes are an important consideration.

113. There are mixed opinions across the sector on whether economies of scale can be realised for digital delivery by expanding group sizes. In theory, providers could make savings by increasing group sizes as capacity is not limited by a physical space for digital delivery. There is no limit to the number of students who can use short lecture-style videos for asynchronous viewing, for example, as not every video would need refreshing at the same rate. Online quizzes, with automated marking, could also scale to larger group sizes with little to no cost implication. Equally, technology can facilitate holding several small group activities for a large cohort, without the accompanying constraints of physical space.
114. More recently, one of the messages that came out strongly from student focus groups facilitated by Jisc for its ‘Learning and Teaching Reimagined’ research was that students preferred online tutorials and seminars in smaller groups. Students reported that they found it helpful for lecturers to encourage social interaction between students (especially for first year students who might find this more intimidating).⁵¹ Indeed research shows that the same response can apply to in-

person teaching.⁵² Some tasks, then, are less well suited to large group sizes. Interviews with digital teaching and learning experts suggest that learning that is activity-focused and builds communities among learners works best with smaller group sizes. Research also suggests that smaller group sizes encourage greater interaction with teaching staff and peers, leading to greater engagement with learning, and allow for more detailed and personalised feedback.⁵³ The smallest group size, one-to-one interactions, is also valuable, particularly for personalised feedback on assessments, and can increase motivation among students.⁵⁴

115. Different group sizes will be appropriate for different teaching and learning activities, and digital delivery, especially online, enables the learning content and environment to be tailored for the learning task. Digital delivery can facilitate interactions, from small one-to-one groups to one-to-thousands models, in a way that would not be possible using solely in-person teaching.

Mike Winter CBE, Director of Global Engagement, University of London Worldwide

‘You cannot cut corners on learning design, or on academic and pastoral support for students.’

Opportunities

Providers should use digital technology consistently to enhance and supplement learning, even if returning to more in-person learning activity.

116. 70 per cent of teachers who responded to our polling found that digital teaching and learning provides opportunities to teach students in new and exciting ways.*
117. Our call for evidence also reflected many successes demonstrating the advantage of digital delivery. Students particularly reflected on their ability to access to digital resources round the clock and ahead of taught sessions. One of the clear messages from interviews with students and student focus groups was that lecture capture was very important to students and should become a standard feature, even if all teaching and learning returns to in-person delivery.

Sarah Kerton, Director, University College Birmingham Guild of Students

‘Students spoke [about] how online lectures allowed them to review learning, returning to their lectures to assess their learning. They also said it encouraged more classroom participation, with more students taking part within the classroom setting in typed discussions, and lecturers having a more generative conversation with them via text rather than in the classroom where they felt anxious and nervous to speak.’

118. In practice-based subjects we also heard that some providers have been surprised by the amount that could be delivered in a digital environment, particularly where this relates to theory, which can then be followed by in-person practical sessions. For example, a short instructional video that demonstrates a particular lab technique can be watched by students asynchronously ahead of time. When students do enter the lab, they already have an understanding of the technique and can use lab time more effectively. The #DryLabsRealScience case study highlights how networks have facilitated innovative solutions and found benefits to delivering remotely in relation to life sciences. In engineering, there are many creative examples of how practical and lab-based skills have been taught in a digital environment – such as a ‘computer based car drag race game’ to teach first year engineering dynamics.⁵⁵
119. In creative subjects, we have heard that some arts specialist providers were struggling to create the ‘studio culture’. However, as we explore further in chapter 4 ‘Build digital skills’, we have also heard positive examples of creative subjects using technology to build digital skills specific to creative industries, such as creating and presenting content for a virtual exhibition.

Teaching staff (via call for evidence)

‘Performing arts does need to have elements of studio time. However, the industry is currently working a lot on outdoors or online delivery and we need to incorporate that change into our methods of delivery and considerations towards what our students will be learning. Moving forward, we want to create a hybrid performer, who [has] been able to still achieve the face-to-face teaching required, but also equipped with digital skills in audio recording, camera work as well as physical and spatial skills when considering Zoom video calls or performances.’

120. We heard that as a result of these successes many teaching staff and senior leaders were considering how to make changes in the long term. These reflections included changing how to use in-person teaching and campus spaces to maximise engagement, making it both meaningful and timely.
121. There are also challenges and unresolved questions about the copyright of teaching and learning materials. The recording of teaching and learning materials, such as lectures that are delivered digitally via videoconferencing software, is practically much easier, and (as we discuss in chapter 6, ‘Embed inclusion’) is highly beneficial for many students. However, some teaching staff told us that they are concerned about this shift from an intellectual property perspective and that they needed clearer guidance and training on copyright for online learning materials. Further work needs to be done with teaching staff to ensure these concerns are addressed, and providers should ensure this forms part of the wider digital skills development for teaching staff (see chapter 4, ‘Build digital skills’).

Case study: University of Worcester

Paramedic science clinical skills lecturers at the University of Worcester developed an innovative online case study format in response to the pandemic, to teach undergraduate paramedics remotely.

Using a blend of audio cues and open-access still and video imagery of scenes and people, the team used Microsoft PowerPoint and Blackboard Collaborate to create a realistic clinical experience for students. Cases used pre-recorded heart and lung sounds, real-time observations via simulated monitors, and microphone and chat functions to undertake assessment and clinical questioning of a simulated patient, played by facilitating staff. Students then devised bespoke treatment plans and clinical handovers based on their findings. These sessions had specific learning outcomes, with lecturers stimulating discussion and encouraging peer learning. Interactive tasks such as mini-quizzes, opinion polls and annotation encouraged student engagement throughout. Debriefing following the sessions promoted deeper learning, which allows students to make connections to real-life practice experiences and reflect on individual and group performances.

Having two lecturers present helped with general support, technical and internet connectivity issues and sharing extra material to support discussion. Students' biggest reported issue is peer microphone dysfunction, with frustration at reduced interaction and chat message delivery delays. Lecturers are reviewing this area to ensure inclusivity.

Following an internal conference presentation, the format has been adopted by a range of professions within the university's healthcare community and adapted to deliver interdisciplinary learning events.

One student said:

'It was good to work alongside other [healthcare practitioners] to gain an understanding of their roles within patient care. I don't think this would have happened if it wasn't an online [simulation]. The other benefit to it being online was the ability to take notes for future reference whilst taking part - something not practical in person.'

High-quality blended learning should be designed so that it allows students to move seamlessly between in-person and digital delivery.

122. We heard how some providers were designing programmes based on a hybrid approach to enable them to move courses across in-person and virtual learning, taking advantage of the variety of different digital formats. There are different ways to approach and deliver teaching content, and there might be ways which suit different types of student.

123. Approaches to learning and designing for an online or blended format can be complex given the number of formats, methods and tools available. Several approaches can be used, and we heard how many providers used and adapted the ‘ABC method’: drawing on work by Professor Laurillard, this method involves using card sets to rapidly create and reshape ‘visual storyboards’ which represent programmes or modules.⁵⁶ We also heard how this methodology prompted staff to focus on the purpose and learning outcomes of their courses, as well as teaching methods and the use of alternative technologies for different types of learning, with some suggesting it as a useful way to approach learning design more generally.⁵⁷

Providers can use course design to tackle isolation and loneliness in a digital environment.

124. Prior to the pandemic, there was well documented research about the risk of isolation and feelings of loneliness in an online learning environment, which can in turn lead to wellbeing and retention problems.⁵⁸ The feeling of loneliness and isolation during the pandemic was reflected strongly by students throughout our call for evidence, interviews and surveys, and is reflected in published surveys from Jisc and Wonkhe.⁵⁹

Student (via call for evidence)

‘The inability to meet people is making me lonely and depressed, so much so that I went home for two weeks. With face-to-face teaching I can talk to fellow students before or after the lecture.’

125. Many of us build strong social connections both in person and in a virtual environment (for example through social media). When designing content, teachers need to consider how to create and foster those relationships within a digital higher education environment. Providers can tackle this issue in a number of ways and they should think carefully about how they: build communities and networks; balance synchronous and asynchronous learning; guide interactions between academics, students and peers;⁶⁰ approach class sizes; and encourage collaborative learning.

Players across the higher education sector need to collaborate to share what works for high-quality digital teaching and learning.

126. In interviews with digital teaching experts and providers we heard how the pandemic created a situation where everyone was ‘in it together’, which broke down walls between institutions and encouraged even better sharing of what works. The move to open-source education practices also enabled effective sharing of ideas and resources, creating the possibility of advancements in new digital tools and techniques at pace.

127. The Open Covid Pledge for Education⁶¹ provides an example of leaning technology practitioners proactively sharing lessons learned as a result of the pandemic. In signing the pledge, practitioners demonstrate their intent to openly license their intellectual property or place it in the public domain where possible, to make this knowledge available to those who could benefit from it.

Case study: #DryLabsRealScience

Dr Nigel Francis (Swansea University), Professor Ian Turner (University of Derby) and Dr David Smith (Sheffield Hallam University) set up #DryLabsRealScience.⁶² The network was established to share best practice, experiences and ideas to support remote learning in the life sciences.

Members of the network have been exposed to a wide range of novel teaching tools and pedagogic approaches to support lab-based delivery and research projects. By creating and sharing videos and how-to guides, the network supports the life science community to address the challenges of delivering effective lab experiences remotely. Showcasing alternative capstone research projects provides opportunities for students undertaking non-lab research projects and highlights how they can acquire a range of graduate skills. These resources provide powerful learning opportunities that will live on beyond the pandemic, and have been showcased by Advance HE, The Biologist and Laboratory News.⁶³

Networks can solve complex problems. The challenges of remote lab provision raised by the pandemic were too large for individual institutions to solve. Working together through the network, practitioners were able to offer and share solutions and collectively learn lessons from personal experiences, creating a supportive and collaborative community of practice.

Focusing on learning leads to effective delivery. The pandemic has forced the sector to rethink the delivery of lab-based teaching and to identify the core aspects of practical learning, asking what the fundamental requirements are during a university degree programme. Those elements that can only be delivered in the physical laboratory, such as psychomotor skills to manipulate physical objects, were prioritised for in-person delivery. Those elements that can be effectively simulated or delivered virtually – for example, gaining familiarity with procedures, experimental design and data generation and analysis – have been shown to be equally, if not more, effectively delivered remotely.

Assessments

128. Digital assessment presents a real opportunity to review, and in some cases redesign, how assessment is conducted and delivered.⁶⁴ Assessment is a core part of curriculum design and digital assessment lends itself particularly well to continuous, formative, and authentic assessment, which can be embedded throughout a student's learning journey. We heard about many successful examples of the move to digital assessment, creating opportunities to explore different

modalities for assessment which many in the sector had been advocating for some time.

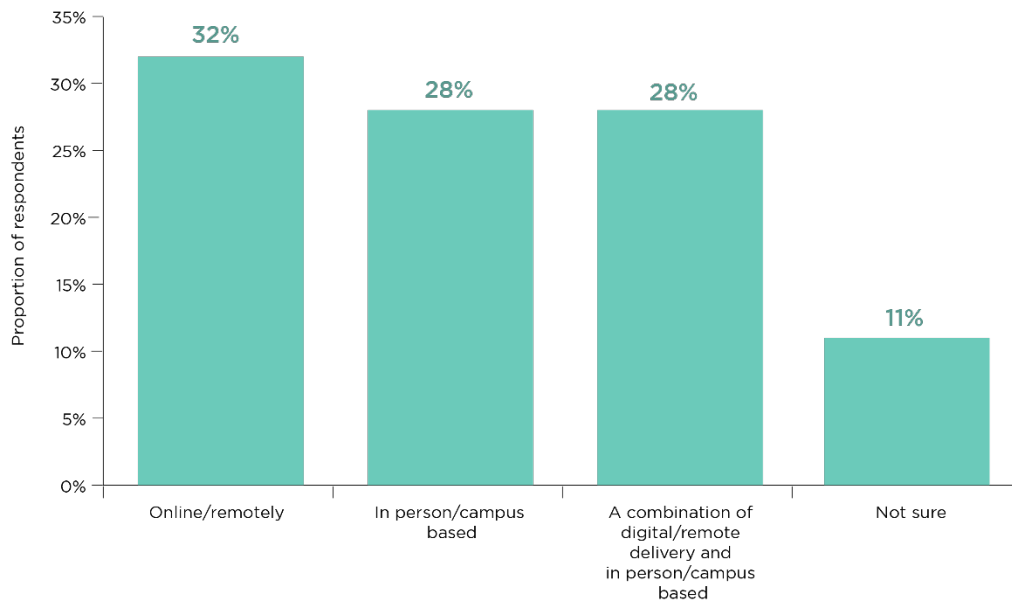
129. The sheer volume of assessments that had to be moved over from in-person invigilated exams to a form of digital assessment cannot be underestimated, with some providers dealing with tens of thousands of assessments across several countries. We heard about a variety of approaches, including open-book exams with a prescribed timeframe, online timed assessments, digital scenario-based assessments, and the use of digital proctoring services across some courses, particularly those which involved accreditation by professional bodies. In some cases where in-person delivery was required, assessments were postponed.

Lessons learned

The days of the invigilated written exams in lecture halls could be over.

130. Some universities told us they had already decided that the days of exams in the lecture hall were over and were putting plans in place to ensure they did not revert to the closed-book, handwritten, essay-style exams as the main form of assessment. Practically, we heard that these assessment exercises were often huge paper-based exercises which had not changed for a long time, whereas digital assessment was much slicker and easier to mark. From an educational perspective, many reflected that they had overused summative assessment and needed to redesign their approach to take advantage of the possibilities presented by digital technology for formative and continuous assessment.
131. Our polling showed that 61 per cent of undergraduate students would like their assessments to be delivered online or through a combination of online and in-person delivery once the pandemic is over. Fewer postgraduate students appeared to want this (45 per cent). As teaching staff consider changes to assessment, they will need to ensure there is close engagement with students to understand any concerns.

Figure 10: Thinking about your assessment and exams once the COVID-19 pandemic is over, how would you prefer your assessment or exams for your course to be delivered? (students)



Note: Source of data is YouGov polling conducted for this review. This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

132. A recent Times Higher Education survey of university staff suggests there is still some way to go, with respondents finding the delivery of online assessments to be challenging. There were also concerns about the accuracy and quality of remote assessments. 59 per cent of respondents agreed or strongly agreed that they found it 'more difficult to accurately and constructively assess their students' performance and progress remotely', compared with 21 per cent who disagreed or strongly disagreed with this statement.⁶⁵

Pearson UK

'The forced move to remote teaching and learning will expedite discussions around authentic assessment and the move to online assessment. The arguments for online assessment were already strong, and discussions about the application of knowledge through assessment rather than repetition of knowledge continue to gain momentum.'

Professional statutory and regulatory bodies should reconsider their approach to digital assessment.

133. We heard that the response by statutory and regulatory bodies to the move to digital assessment was variable. While some were flexible, others felt strongly that assessment would need to be in person to protect their standards and requirements, meaning that digital assessment was not possible. Many regulators that did agree to digital assessment, and in some cases requested that providers used proctoring services⁶⁶ to allow for courses to be accredited. Many recognised that there is scope to work with regulators in future to explore the use of digital assessment that is still aligned with regulators' needs and meets their standards and requirements.

Digital assessment for practice-based subjects and placements remains a challenge.

134. Throughout this review, we heard about the many impressive and innovative approaches to digital assessment and learning for practice-based subjects. Some managed to adapt and amend most of their courses, but we heard that some assessments and placements had to be cancelled and postponed.

Issues around plagiarism, cheating, academic integrity are areas that need substantial attention in both in-person and digital environments.

135. Academic misconduct is an ongoing concern for higher education providers and academics in relation to both digital and in-person assessment.⁶⁷
136. Digital technology has played an important role for some time in supporting providers to detect plagiarism across learning modes.⁶⁸ Developments in technology allow for increasingly sophisticated methods for identifying plagiarism and cheating. Authentication using biometrics such as facial recognition software, authorship analysis that can analyse keystrokes and assess students' writing style and proctoring software to invigilate online assessments, are just some examples being used across the sector. Providers will need to think carefully about how they can take advantage as the technology improves, ensuring appropriate investment in those which are flexible and can work with their existing systems and tools (see chapter 5, 'Harness technology effectively').⁶⁹
137. Some higher education providers used proctoring software during the pandemic to support the delivery of digital assessments. We heard that there have been some challenges associated with the use of digital proctoring software. Some students have raised concerns about digital proctoring related to the invasion of privacy. Some international students also experienced issues with this software due to differences in bandwidth available in other countries. These issues are not new and

clearly care should be taken to work with technology companies, staff and students to address these concerns whenever this kind of technology is implemented.

138. The forced shift to digital teaching and learning has prompted a wide-scale review of approaches and engagement in assessment design. Assessment redesign will play a fundamental role in addressing various forms of cheating that can be further enabled by technology, through authentic and integrated assessments. For example, we heard that some teaching staff were likely to keep open-book online exams, and planned to adapt assessments to include more unseen problems for students to work through over a longer period, while others planned to incorporate more collaborative projects engaging with digital environments.⁷⁰

Digital assessment can be more accessible.

139. One provider told us that, while usually it receives hundreds of notifications about adjustments required over the assessment period, particularly for disabled students, it received only a handful for digital assessments. From a practical perspective, we also heard that digital viva voce exams enabled providers to draw on a wider number of external examiners, including some from other countries.
140. While for many groups of students, the move to online assessments has been a successful experience and the positive aspects should be retained, it will be important to ensure that online assessment does not have a disproportionately negative impact on any particular groups of students (for more on this, see chapter 6, 'Embed inclusion').

Student, University of Sheffield

A survey conducted by the University of Sheffield of 348 disabled students found that almost all respondents who had been set 'from home' exams considered these a better way of completing assessments than sitting a more standard exam on campus:

'They have allowed 24-hour time slots for exams, which has been very helpful. As a dyslexic student it takes me a lot longer to read and process written information and so this time period has allowed me to show my knowledge to the best of my ability without having to panic about a two-hour time limit.'

Case study: University of Cambridge

According to a survey conducted by the University of Cambridge of 550 disabled students, significantly more students found the switch to online assessment to be positive than negative, when compared with in-person exams sat in 2019. Students commented on what they felt to be the improved accessibility of the exams. As one student respondent said, 'I feel like the extended exam approach finally levelled the playing field for students with learning or mental disabilities.'

Opportunities

141. Digital assessment is not just consistent with the maintenance of rigour, standards and consistency over time – properly utilised, it can enhance them.
142. Digital approaches create the potential for far more sophisticated ways to conduct assessments in ways not possible or too costly to implement using in-person methods. These approaches can range from delivering authentic assessments, by working through a problem using remote datasets or simulated tasks, to continuous assessment practices embedded throughout learning tailored to a student's ability, for example by using artificial intelligence to allow for adaptive learning and personalised assessment tasks and feedback. Similarly, using sophisticated software like proctoring and automated marking can provide for greater consistency by reducing human error and improving impartiality. Tools such as automated marking for essays which use artificial intelligence can save staff time and provide instant feedback to students, but there are potential risks and ethical issues to consider and a need to ensure that these tools supplement rather than replace staff feedback over the duration of their course.⁷¹ In all these cases, the sector will need to work closely with education technology companies to develop these forms of assessment to address challenges, such as privacy concerns, accessibility and integration with existing systems and tools identified in the previous section and chapter 5, 'Harness technology effectively'.⁷²

Professor Simon Guy, Pro-Vice-Chancellor Global (Digital, International, Sustainability), Lancaster University

'Digital assessment and feedback has become firmly embedded. Online submission and digital feedback practices were established in some departments, but the impact of the pandemic and lockdown has effected a shift to this approach across the whole institution. Digital assessment and feedback offers pedagogic and logistical advantages from a lecturer and student perspective, opening up opportunities for a wider variety of assessment and greater alignment between assessment and feedback practices.'

Seize the opportunity to reconsider how assessments align with intended learning outcomes.

143. In interviews with providers, experts and students, we heard about positive experiences of the use of digital assessment, with many pointing to assessments as the biggest area for immediate reform. Prior to the pandemic, many providers were moving slowly and cautiously towards digital assessment methods and away from examinations invigilated in a lecture hall. Those we talked to had planned to make changes over the next few years, using an incremental approach. The pandemic accelerated plans, obliging many to move to digital assessment immediately. Even where courses are planned to revert to in-person delivery, the process of trialling digital assessment has prompted teaching staff to think about how digital assessments could be incorporated into students' courses, particularly where they can provide an opportunity for peer-to-peer learning.

Advance HE

'There have also been improvements to assessment of the kind educational developers and educational researchers have been seeking for many years. So, a move away from standardised assessments that mainly test "declarative" knowledge (the opposite being "functional" knowledge) towards more authentic assessments.'

Personalisation in assessment

144. We also heard that some providers were actively considering how future students could choose how they were assessed from a framework of options, an area of development supported by the Disabled Students Commission.⁷³ An example of how this has been done in practice is the University of Edinburgh's MSc in Digital Education.
145. There are also opportunities for artificial intelligence to provide personalised assessments and feedback in higher education (see chapter 5, 'Harness technology effectively') for more on this).

Case study: University of Edinburgh

The University of Edinburgh's MSc in Digital Education is a fully online programme, which gives students the option to choose the mode of their assessment. Students can define their own topic for assessment and present it in different formats. For example, rather than writing an essay, they can choose to create a video, an illustrated web essay, an audio document, a piece of code or a game. As well as core assessment criteria, students can also nominate their own assessment criteria to reflect the mode they use. These are negotiated and agreed with the tutor.

Students are often very keen to take the creative approach. However, they can be risk-averse, with a tendency to focus instead on the more familiar format – the conventional essay – particularly when pressed for time. When students do take the more challenging route, the work they produce is often outstanding, simultaneously creative and deeply critical. In the best assignments, the medium chosen becomes part of the argument itself.⁷⁴

Digital, visual and audio skills are vital to contemporary practice in many fields of work and research. Allowing students to create assignments in a range of media can enrich and build depth of learning.

When students embrace multimodality, they often dedicate very significant time to it, and find themselves very immersed in the process. Students describe finding it highly rewarding and engaging, but can also experience uncertainty when feeling they lack the necessary technical skills to produce original digital content. For this reason, the creation of multimodal work is always preceded by dialogue with tutors around the format and how it will align with assessment criteria.

Recommendations

Design teaching and learning specifically for digital delivery using a ‘pedagogy-first’ approach.

146. Teaching and learning materials need to be designed for delivery in a digital environment. Simply replicating materials that were previously used for in-person delivery is unlikely to be the most effective way to achieve strong learning outcomes for students.
147. Pedagogy should be placed at the centre of the design process, as opposed to this process being driven by technology. The redesign of digital teaching and learning should be led by a strong focus on the way that students learn.

Diana Laurillard, Professor of Learning with Digital Technologies, University College London

‘The most important thing to prioritise when designing digital teaching and learning is to understand what it takes to learn – there’s no point in starting with the technology. We need to focus on how students learn and begin the learning design from there. We should be going to the technology with that requirement and become much more active consumers in this respect.’

Co-design digital teaching and learning with students at every point in the design process.

148. Co-designing digital teaching and learning with students is crucial for high-quality digital learning and should be integrated into every part of the process, from the initial design to the final delivery. Consider whether teaching staff would benefit from training in how to co-design with students, and whether they have the right resources to facilitate this, noting that it can be a time-intensive process.
149. Create regular opportunities for students to give meaningful feedback on their digital teaching and learning. Following this, teaching staff should take this feedback into account and regularly update and revise the digital teaching and learning as part of an iterative process of development and improvement.

Seize the opportunity to reconsider how assessments align with intended learning outcomes.

150. Teaching staff should capitalise on the opportunity presented by the pandemic to re-evaluate how assessments are linked to intended learning outcomes. There is also an opportunity for a renewed focus and shift towards more 'authentic' modes of assessment which focus on the application of knowledge and skills acquired.

Chapter 3: Ensure digital access

151. From the beginning of lockdown in March 2020, the rapid shift to emergency remote teaching and the subsequent need for students to work in environments such as family homes or shared accommodation created issues around access to the equipment, infrastructure, and space needed to engage successfully in digital teaching and learning.

What is digital access?

152. In Table 1, we propose a practical definition of digital access that brings together the essential items of the digital infrastructure a student needs to engage with digital teaching and learning. The components of this definition have been developed and refined based on the research conducted for this review.
153. In 'Recommendations' at the end of this section, we outline how this definition can be used to facilitate a systematic response to challenges around digital access on an individualised basis.
154. A student has digital access when they have all the core items of digital infrastructure listed in Table 1.

Table 1: Definition of digital access

Element		Criteria
Appropriate hardware	=	Students have the hardware that allows them to effectively access all course content. Hardware is of the specification required to ensure that the student is not disadvantaged in relation to their peers.
Appropriate software	=	Students have the software they need to effectively access all aspects of course content.
Robust technical infrastructure	=	Technical infrastructure and systems work seamlessly and are repaired promptly when needed.
Reliable access to the internet	=	Students have reliable and consistent access to an internet connection. Reliability and bandwidth of the internet connection are at a sufficient level for ensuring that a student is not disadvantaged in relation to their peers.
A trained teacher or instructor	=	Students have a trained teacher or instructor who is equipped to deliver high-quality digital teaching and learning.
An appropriate study place	=	Students have consistent access to a quiet space that is appropriate for studying.

The pandemic compounds the issue of students having no or limited access to these core items of digital infrastructure.

155. Despite this, there has been limited research into this problem in the context of higher education specifically, with much of the research and discussion being focused on primary and secondary schools. In one of the few examples, the Education Technology Action Group (a ministerial group set up in 2014) set out a number of recommendations for schools, colleges, and universities in relation to equality of access to digital equipment.⁷⁵ However, the focus of these

recommendations was primarily on broadband connectivity on the physical campuses of schools, colleges, and universities themselves. Given that digital teaching and learning is likely to become more widespread after the pandemic, the scope of issues has now become much broader and extends beyond the physical campus and to the student's home set up.

Digital access during the coronavirus pandemic

Higher education providers and teaching staff have gone to impressive lengths to address this issue.

156. Through our research, we have heard many examples of the creative ways in which higher education providers have managed the challenge of digital poverty to ensure that students had continuity of access to their learning. Students and staff often worked together to develop creative solutions to the challenges of digital poverty, showing resilience and flexibility in their response. For example, some higher education providers delivered 4G dongles to students and expanded existing laptop loan schemes for students in need. However, many also noted that while these were effective 'crisis response' strategies, they are not likely to be sustainable over the longer term.

Jenny Coyle, Programme Leader of HNC and HND Acting and Musical Theatre, The City of Liverpool College University Centre

'One case I experienced this year was with a BA student who didn't have access to a laptop nor wi-fi. She has a young daughter and could only really work after she had gone to bed. I worked with her using WhatsApp voice notes, which she performed some evaluative assessment on but also doing tutorials via phone [...] our final assessed tutorial was on a video call via WhatsApp, which was recorded audio and video. This student was close to giving up at the start of lockdown, but has walked away with a 1st Class BA Hons Degree.'

Case study: University of Wolverhampton

Laptop loans and wi-fi dongles were made available in April 2020, following the start of lockdown in March 2020. These laptops were loaned primarily to Level 6 students with the most need for IT equipment. Many of these students would previously have used IT equipment provided on university premises, typically in the library or social learning spaces. The library and some social learning spaces were reopened at the end of the first national lockdown for students to use IT equipment, and a revised laptop loan scheme is now available for all students.

To support students who did not have access to an appropriate device, the university ensured that digital sessions and materials could be accessed via the mobile app of the Canvas learning environment.

The university also developed alternative methods of assessment for students who did not have access to an appropriate device. For example, students could write out assignments by hand, take a photograph of the work and then upload the photo to the assessment submission area.

Over 90 per cent of the students who were loaned a laptop in the initial lockdown have either completed their award or been able to progress.

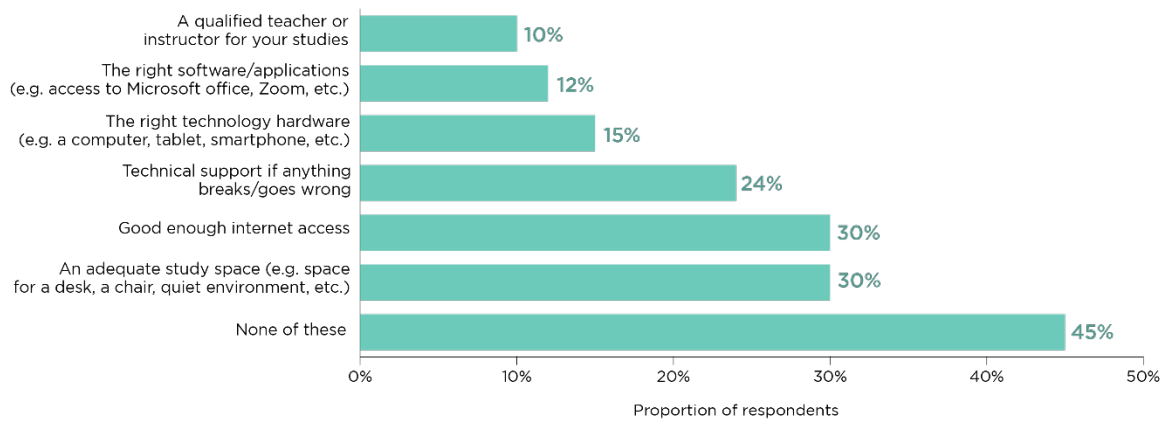
The University of Wolverhampton is continuing to add new devices to the laptop loan scheme. It is also looking at ways of supporting students who face digital poverty, through a potential repurposing of the university's travel fund for all students, and through changing the criteria of the university's hardship fund to explicitly include digital poverty.

A lack of reliable internet access has had a significant impact on students and staff throughout the pandemic.

157. According to our polling, around 30 per cent of students lacked good enough internet access while learning online this academic year, and around 30 per cent did not have access to an adequate study space. Students from different regions of the UK appear to have had significantly different levels of reliable internet access while learning online: 38 per cent of students in the North West had experienced being without reliable internet access, compared with just 23 per cent of students in London.^{‡‡}
158. Higher education providers often told us that, while the vast majority of students did have some level of internet access, the main issue was that their bandwidth was not sufficient for the number of household members who were now using the connection at the same time. This meant that these students struggled to access synchronous learning activities such as live lectures or seminars delivered over videoconferencing software.
159. Issues with internet access also affected teaching staff. In our polling, 31 per cent of staff reported that they had been without good enough internet access while delivering digital teaching and learning.

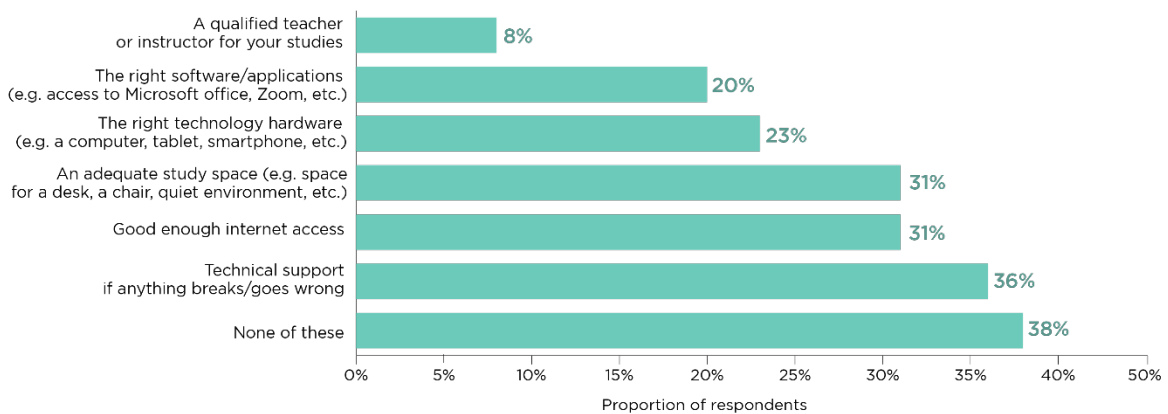
^{‡‡} This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Figure 4: While digitally learning this academic year, have you been without access to any of the following? (Please select all that apply) (students)



Note: Source of data is YouGov polling conducted for this review. This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Figure 3: While delivering digital teaching and learning, have you been without access to any of the following? (Please select all that apply) (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

Case study: Birkbeck, University of London

In response to the pandemic, Birkbeck took the strategic decision to redesign its 2020-21 teaching delivery model to enable it to deliver fully online and to a high standard from the autumn. As part of its preparations, the college conducted a survey in May 2020 to assess the extent of digital poverty across the student body. This survey was then used to direct and inform actions to support students with digital access challenges. These actions included:

- The introduction of a new fund to support home and EU students who were unable to pay for the cost of essential IT resources such as a laptop or internet access. Students were eligible if they had a household income below £25,000.
- Students unable to study from home were able to book a desk with a PC and internet connection.
- A 'Prepare to Learn Online' section was added to a new online orientation module. This introduced students to the technologies that are used for digital teaching and learning. This included a quiz for students to assess their digital skills that directed them to resources and training based on their confidence levels (over 1,600 students have now completed this quiz).

Birkbeck is continuing to survey students on their views about its response to the pandemic. This feedback will be used to make improvements to its support for digital access in the future.

Study space has been a particular issue during the pandemic.

160. The combination of the closure of libraries and alternative study spaces, such as cafes, with the return of many students to family homes with multiple household members sharing communal spaces, has meant that appropriate study space has often not been available to students. In some cases, students were unable to find a quiet and private space in which to take exams or other forms of assessment. Students also need access to environments that validate their desire to learn, for example some students learning at home may be put under pressure to assist other family members or feel guilty if they are spending time learning rather than other things. For some students with particularly challenging home situations, studying in their home environment may have caused stress, anxiety, or other mental health problems.

Goldsmiths, University of London

'While it is tempting to consider our students as digital natives who live their lives online, the reality is different and we are a diverse community, studying different disciplines which require different access to different levels of equipment. Students who returned to their family homes may have had to share devices with siblings who were also required to study at home. Our commuter students may have found their homes busier, with family members working and studying there where they would usually be out.'

Recommendations

Proactively assess students' digital access on an individual basis and develop personalised action plans to mitigate any issues identified.

161. Higher education providers should engage with every student with digital access challenges on an individual basis before their courses start to assess their level of digital access. If they are missing one or more of the core items of digital infrastructure listed in our definition, then providers should work with students on a one-to-one basis to develop an action plan for how these issues will be mitigated.
162. The process of creating this personalised action plan should involve systematically reviewing the student's access to the core items of digital infrastructure collectively defined here as the components of 'digital access', and offering practical, problem-solving guidance where the student does not have access. For example, where students do not have appropriate study space, options might include working with other organisations to see whether students could be offered space to work – could students access local libraries, or work with schools or colleges to find an appropriate space to study?
163. In addition to problem-solving guidance for students, higher education providers should think creatively about how they can improve the support they are offering to students with poor digital access. For example, is there a way to bulk-buy devices that might offer students the opportunity to loan or purchase them at a discounted rate?
164. Students' digital access should be reviewed frequently and regularly (for example through pulse surveys) and students should have a clear understanding of how to inform their higher education provider of any changes to their circumstances with regards to digital access.
165. Any equipment that students need to study should be communicated well in advance of the start of the course. In doing so, higher education providers should take care not to unintentionally discourage or exclude students from underrepresented backgrounds who may have difficulties in obtaining this equipment. Timely communication should never undermine efforts to widen access. Where students do not have the financial means to purchase the equipment they

need to study, higher education providers should offer advice on any sources of financial support that are available. The criteria of existing bursary schemes may need to be adapted to meet the needs of students.

166. There can be a stigma associated with poor digital access that can prevent students from asking for support. Communication with students about this subject should be discreet and managed carefully by the higher education provider.

Case study: Royal Northern College of Music

The Royal Northern College of Music (RNCM) asked all students on registration whether they had access to the right hardware, to an appropriate study space, and a reliable internet connection (including whether it was a shared connection with others). It asked students what impact they anticipated this might have on their digital learning.

Students can update this record if their situation changes, and this information is used throughout the year, to track the resources that students have available to them and any problems students encounter throughout the year. Teaching staff are asked to update to regularly monitor this record throughout the year to ensure that this information is incorporated into their planning.

265 students have completed the online form and RNCM used this information to prioritise access to the building for students who needed this, and investments to address any barriers to their studies.

25.7 per cent of students raised concerns about their internet connection, especially when multiple users were participating in online teaching simultaneously. This can affect sound quality and feedback, which is vital in one-to-one instrumental and vocal study, so where internet connection has been a significant problem for students, they can request permission to use an onsite Zoom room for their lessons.

Students have been asked to review the online form following recent changes to coronavirus restrictions and the start of the spring term. RNCM will be conducting a full evaluation later in the year to decide whether this form will become part of its standard registration procedures.

While digital poverty remains a significant issue, RNCM recognises this as an opportunity to modernise the teaching and learning of a conservatoire, and is now looking to further integrate technology into teaching and learning for the longer term.

Consider students who have poor digital access when designing digital teaching and learning materials or procuring technology.

167. The absence of one or more of the core items of digital infrastructure has implications for the format and medium of digital teaching and learning that a student can access. Digital teaching and learning should be designed so that students who have lower bandwidth connections can access all content, and asynchronous alternatives should be made available for students who do not have reliable internet access.
168. Providers and the sector as a whole should absolutely strive to improve digital infrastructure and capitalise on the pedagogical opportunities this will afford; as levels of digital access improve (for example, through the thorough and regular digital access check-ins outlined in the previous recommendation), there will be ever greater scope for more advanced technology to be used as standard practice in digital teaching and learning. This progress should never be at the expense of learners today, however, and wishful thinking will only lead to lost learning.
169. Higher education teaching staff and leaders will need to work through this balance carefully, at multiple levels of their organisation. This section has already covered consideration of individual students; leaders will also need to reflect on these considerations when making strategic decisions. For example, the needs of students who do not have one or more of the components of digital access should be considered in decisions relating to the design and procurement of technology.

Consider the impact of limited digital access on students from disadvantaged backgrounds.

170. Achieving an equitable experience of digital teaching and learning will be influenced by the extent to which inequalities in digital access in other parts of the education system, such as primary and secondary age schools, are removed.
171. This is of particular importance in the context of pandemic, which has disproportionately affected lower-income households.⁷⁶ The closure of schools is also likely to widen pre-existing socioeconomic gaps in educational attainment. For example, interim findings from a study of Key Stage 1 pupils by the Education Endowment Foundation found evidence of a 'large and concerning attainment gap between disadvantaged pupils and non-disadvantaged pupils'.⁷⁷
172. In light of this evidence, the hard work of providers and other organisations to improve access and participation matters now more than ever. The environment has changed, and in some cases the challenges are greater: the sector will need to rise to the challenge and continue to deliver against the ambitions set out in its access and participation plans. Policymakers too will need to reflect on how the world has changed, and increasingly digital access and excellence will need to be considered within regulatory mechanisms.

Chapter 4: Build digital skills

173. Once teaching and learning has been redesigned for a digital environment and the requirements of digital access have been met, we argue that building strong digital skills among students and staff should follow. There are also many opportunities for enhanced digital skills to be used to improve graduate employability, improve links with local communities, and address national skills shortages. In our recommendations, we outline what a successful approach to building digital skills looks like, with practical suggestions for action.

What are digital skills?

For a comprehensive framework that outlines the six core areas of digital skills or ‘capabilities’ for students and staff, see Jisc’s digital capability framework.⁷⁸ The framework is made up of the following components:

- ICT proficiency (digital proficiency and digital productivity)
- information, data and media literacies
- digital creation, problem-solving and innovation
- digital communication, collaboration, and participation
- digital learning and development
- digital identity and wellbeing.

Lessons learned

Students’ confidence in their digital skills is generally high but support could be improved.

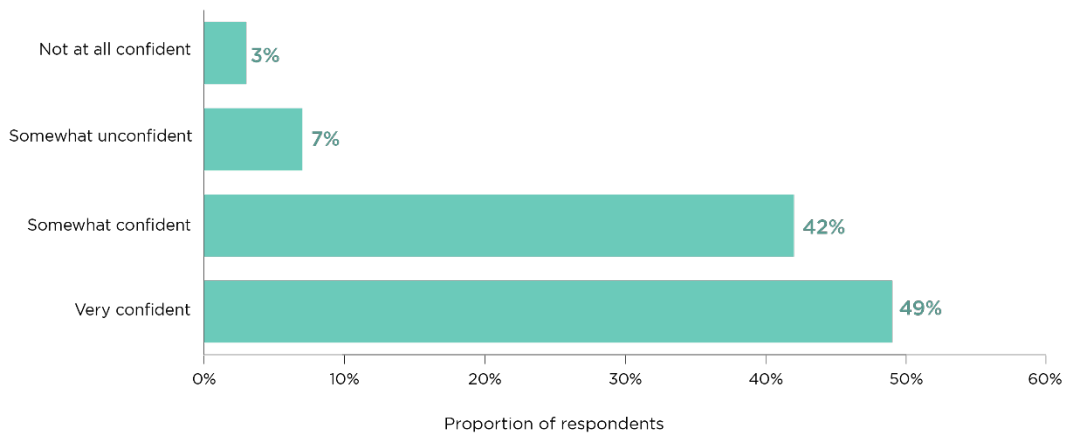
174. Our polling suggests that students’ confidence in their digital skills is high: 91 per cent feel ‘very confident’ or ‘somewhat confident’ that they have the digital skills needed to engage in digital teaching and learning.^{§§} In relation to teaching staff, students reported being more confident than staff in having the skills they needed when it comes to digital teaching and learning:

- 21 per cent of teaching staff feel they are ‘very confident’ that they have the knowledge and skills needed to deliver teaching online.

§§ This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

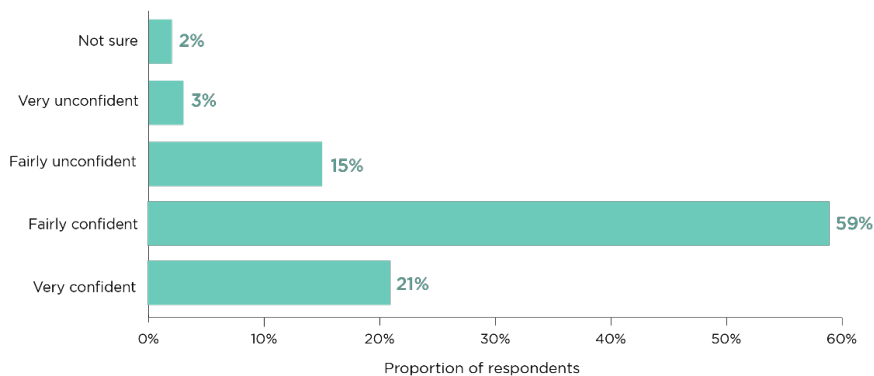
- 49 per cent of students feel they are ‘very confident’ that they have the skills needed to engage with their digital teaching and learning.***

Figure 2: How confident or not are you that you have the digital skills necessary to successfully engage with the digital teaching and learning you are receiving? (students)



Note: Source of data is YouGov polling conducted for this review. This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Figure 1: How confident or not are you that you have the knowledge and skills necessary to design and deliver digital teaching and learning? (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

*** This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

175. However, we also heard from several higher education provider leaders and teaching staff that they had found it important not to assume that all students were ‘digital natives’ who had advanced digital skills across the board.
176. In addition, our polling found that students’ previous experience of digital teaching and learning was limited. This was especially true for undergraduates, 68 per cent of whom had no experience of digital teaching and learning before the beginning of the first lockdown in March 2020 (compared with 51 per cent of postgraduate students who had no experience of this).^{†††}

Ian Dunn, Provost, Coventry University

‘We cannot assume students are digital natives when we design content.’

177. Despite students having generally high confidence that they have the digital skills they need, research suggests that the quality of digital skills training that they receive could be improved. A 2020 Jisc survey⁷⁹ found that only 60 per cent of students rated the quality of support they receive from their organisation to develop their digital skills as ‘good’, ‘excellent’ or ‘best imaginable’.
178. A forthcoming Jisc survey highlighted that communication with students about the digital skills they need is often limited. Only 42 per cent of students agreed that they received guidance about the digital skills they needed for their course. Only 25 per cent agreed that their organisation provided them with an assessment of their digital skills and training needs. Students in further education colleges appear to be experiencing higher levels of digital skills support, with 54 per cent reporting they received guidance about the digital skills needed, and 43 per cent reporting that they have been provided with an assessment of their digital skills and training needs.⁸⁰

Teaching staff felt they lacked the digital skills needed to design and deliver digital teaching and learning in March 2020, but there has been an impressive boost in staff digital skills since then.

179. According to our polling, 47 per cent of teaching staff had no experience of digital teaching and learning at the beginning of lockdown in March 2020. Through our call for evidence, we heard that staff digital skills were often a barrier to the successful delivery of digital teaching and learning in the early stages of the pandemic.
180. However, there appear to have been significant improvements from the start of lockdown in March 2020. Jisc research for the Learning and Teaching Reimagined project showed a significant increase in the proportion of lecturers who described themselves as confident in using digital technology to deliver online learning and

^{†††} This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

teaching between the start of lockdown March 2020 and the start of the next academic year in September 2020 (from 49 per cent to 74 per cent).⁸¹ Similarly, a Times Higher Education survey of teaching staff found that 75 per cent of respondents agreed or strongly agreed that they are 'doing or would do a better job of online teaching the second time around', relative to 6 per cent who disagreed or strongly disagreed.⁸²

Staffordshire University (via call for evidence)

'At the outset, some staff didn't have requisite threshold skills to move swiftly to successful online delivery (including effective engagement strategies), beyond placing taught content onto a [virtual learning environment] platform. We began to address this quickly by increasing our staff development offer significantly and the majority of staff are now digitally confident to deliver effective blended learning. This work now needs to be expanded, further evaluated and enhanced.'

Dr Clare Saunders, University Director of Learning and Teaching, University of Greenwich

'Digital skills development, and the adjustment of staff workloads to create capacity for the move to high-quality digital learning and teaching, have been rapidly deployed, but will also require sustained investment.'

Case study: Keele University

Keele University has produced a series of professional development workshops with input from digital education experts and tutor 'trailblazers' who innovate in digital teaching and learning design.

Workshop topics include:

- Creating and sustaining online communities
- Online collaboration: teaching scenarios
- Designing digital assessments and encouraging digital legacy
- Integrating Blackboard and Microsoft Teams.

The workshops catered for 560 live participants, and each workshop was recorded to allow staff to engage at a time that was convenient for them. An accompanying forum was created for teaching staff to reflect on the workshops, solve problems and share innovation.

In the longer term, the university will seek to ensure that workshops and resources are shaped by student voice, as opportunities to build in student-led design were limited in the early stages of conducting the workshops and collating resources.

The shift to digital teaching and learning has prompted thinking about how digital skills can improve students' graduate employability.

181. The experience of the coronavirus pandemic had prompted fresh thinking within higher education providers about how a wide range of aspects of teaching and learning might need to change to better prepare students with the digital skills they would need for an increasingly digital working world. This was particularly true for higher education providers specialising in creative and performing arts, teaching subjects such as music, drama, and dance. Several told us, while there were significant barriers to teaching and learning delivery (due to the practical nature of the subjects taught), they were also now considering how they could adapt the curriculum to prepare students with the digital skills they would need to thrive in the creative industries they were looking to work in.

Higher education provider (via call for evidence)

'Delivering digitally and building students' digital skills is going to enable them to become employable, independent and autonomous creatives.'

Andy Beggan, Dean of Digital Education, University of Lincoln

'One anticipated change for art-based programmes is courses placing more emphasis on developing student digital and website development skills in preparation for more virtual performance and exhibitions.'

182. The shift to digital teaching and learning has also improved students' 'soft' digital skills. In other words, in becoming confident users of digital technologies such as videoconferencing software and collaborative working platforms such as Microsoft Teams, students were also building digital skills that are likely to be useful in the jobs they have after graduating.

Case study: Matrix College of Counselling and Psychotherapy

Matrix College of Counselling and Psychotherapy added content to its syllabus that taught students the skills required to delivery counselling online and covered the practical and ethical competencies involved. This additional training enabled students to continue their training and gain the practice experience required for their degree award. Matrix College also delivered additional training for staff on

teaching online counselling and supporting students with online learning. It also changed the format of all teaching weekends to provide students with further opportunities to practice and assess the skills needed for working as counsellors online. In the longer term, the college will continue to include online delivery of counselling as part of all its courses and as part of staff training.

By offering other forms of digital skills training and development, higher education providers can foster stronger links with local communities and address digital skills shortages.

183. Through our call for evidence, we also heard examples of higher education providers that are now considering how they can use digital skills training to build stronger links with local economies and to address digital skills shortages in the workforce. Where digital skills courses are delivered in a digital environment, and therefore do not need the teacher and student to be in the same physical location, this provides flexibility which is particularly valuable for students who are managing other commitments such as full-time working or caring responsibilities.
184. Digital skills training and development also offer an opportunity to contribute to addressing national digital skills shortages. When examining the nation's digital skills, the UK Science and Technology Committee reported that 23 per cent of the adult population lack basic digital skills, costing the national economy an estimated 63 billion pounds per year – a situation which the report referred to as a 'digital skill crisis'.⁸³ Similarly, the UK Digital Consumer Index from Lloyds Bank (2020) found that an estimated 11.7 million (22 per cent) people in the UK are without the skills needed for everyday life.⁸⁴

Teesside University

'During lockdown Teesside University ran a "Digital Skills for Growth" programme of digital taster sessions and accredited short courses for industry and teachers in the Tees Valley and Durham County. The project is considered an excellent example of delivering flexible CPD [continuing professional development] and there are opportunities for online CPD delivery regionally, nationally and internationally.'

Case study: Staffordshire University

Staffordshire University's 'GradEX' event – a showcase exhibition of students' final year projects to industry experts – was moved online because of the coronavirus pandemic. The revised event centred around a portal that allowed students to interact with employers and experts directly. The idea behind Digital GradEX is to flip the traditional concept of a careers fair and instead showcase the knowledge, skills, and experience that Staffordshire University students have gained throughout their courses.

Sections of the interactive portal that related to future careers were accessed by over 46,500 unique users from 63 different countries across three months, a significant increase from the 500 attendees who previously attended the in-person event.

Using analytics from its online portal, the university found that strong engagement between students and industry experts took place at this digital event, and over 100 students secured different types of work experience as a result. The event also strengthened employer partnerships, which the university will aim to use to further knowledge exchange and alignment of the curriculum with rapidly changing employer needs.

GradEX in 2021 will remain digital and Staffordshire University aims to have over 1,000 students involved in the 2021 event. The learning from this journey will be shared across the university to explore how other events and programmes could successfully move online to enhance engagement and impact.

Recommendations

Communicate clearly to students the digital skills they need for their course before their course starts.

185. Higher education providers should clearly communicate to students the digital skills they will need for the course in advance of the course starting. In addition, higher education providers should offer clear information to students about how they can access resources to acquire the digital skills they need for their courses. This was also a recommendation of Jisc's Student Digital Experience Insights survey (2020), that higher education providers should 'suggest or provide digital skills development activities that students can engage in while they are waiting to start their courses.'⁸⁵

Consider how course content could be adapted to offer further opportunities for digital skills development.

186. Digital teaching and learning also provides an opportunity to align the course content itself with the relevant digital skills that graduates of that subject might be expected to have. For example, performing arts graduates may now be expected to understand how to navigate a virtual audition. Across other subjects, higher education providers are already (and should continue) re-evaluating how the current offering is setting students up for success as graduates, and whether this could be further improved given changing working environments that are now shifting even more rapidly to digital ways of working.

Case study: Rose Bruford College of Theatre and Performance

Rose Bruford places equal emphasis on learning skills (practical and intellectual) and subject knowledge. For example, the curriculum ensures that students gain experience working independently and in groups using interactive online learning materials, employing multi-media portfolio software to document and present their learning journey, and create collaborative projects online. Students also work with specialist tutors synchronously, using video conferencing software.

Teaching staff introduce students to the basics of learning technologies at the induction stage and develop additional skills as they progress by embedding digital competencies within subject content and across levels of study. Students can choose the mode, medium and content for assessment in each topic, allowing them to showcase their digital skills in practical and creative ways.

Negotiating across a range of digital platforms means students gain employability skills in communication and technical aptitude. In addition, working within an international cohort online builds awareness across topics of study in a range of contexts, and promotes learner autonomy.

Create mechanisms that allow students to track their digital skills over the duration of their course, and allow these skills to be recognised and showcased to employers.

187. Jisc's 'digital capabilities' framework may provide a helpful framework for breaking down 'digital skills' into specific competencies that can then be demonstrated, tracked, and assessed throughout the student lifecycle. As explained above, this framework breaks down digital skills into six categories:
- ICT proficiency (digital proficiency and digital productivity)
 - information, data and media literacies
 - digital creation, problem-solving and innovation

- digital communication, collaboration, and participation
- digital learning and development
- digital identity and wellbeing.⁸⁶

188. 'Digital 'passports', badges, or certificates that allow for recognition of specific digital skills (such as expertise in a particular specialist software and competencies below the level of the student's degree) could be useful ways to incentivise students to develop digital skills and boost graduate employability.

Case study: University of Sheffield

The University of Sheffield has created a series of online courses for students to build their digital skills. The series includes resources tailored for students at different levels of study, and students can use these independently or they can be used by departments as part of induction programmes. Students can build towards an academic skills certificate, which recognises and acknowledges the development of their skills throughout their course of study.⁸⁷

Adopt a strategic approach to the development of staff digital skills that incentivises excellence and continuous improvement.

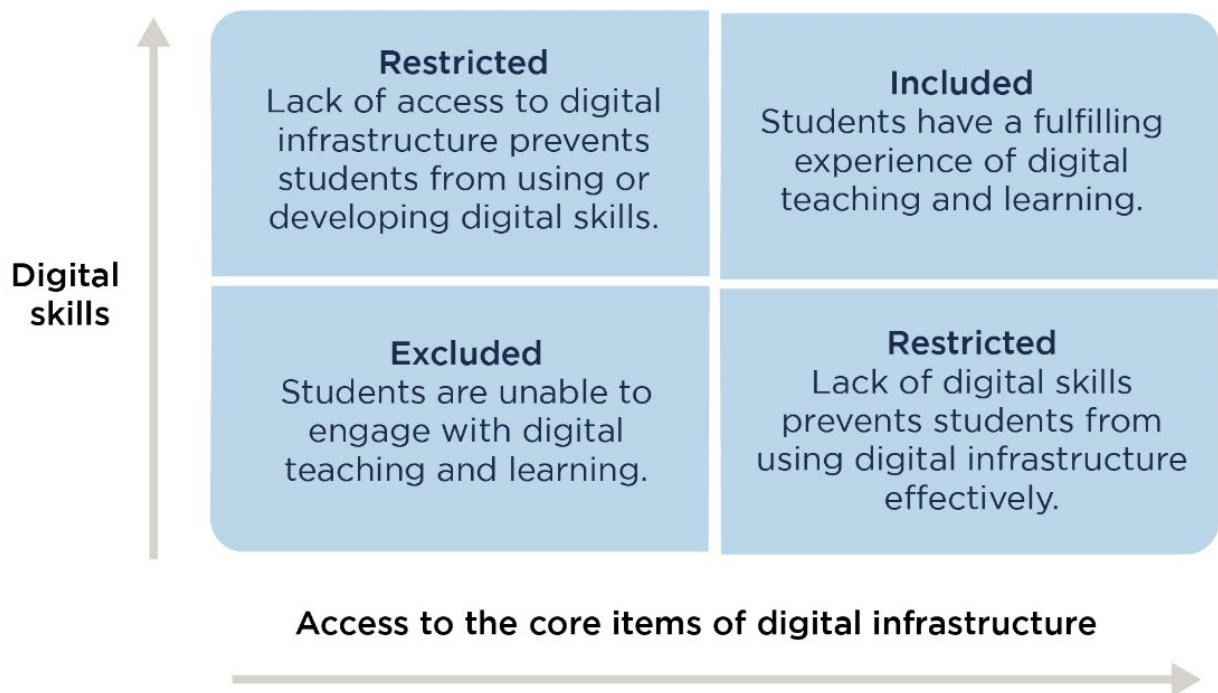
189. Staff should have a clear understanding of the digital skills they are required to have and should be given opportunities to upskill. As we explore further in chapter 7, 'Plan strategically', successful digital teaching and learning relies on a strong commitment to high-quality digital teaching and learning being embedded at all levels of a higher education provider.
190. Reward and recognition structures, as well as professional development frameworks, may need to be revised to consider more explicitly the need for high levels of digital skills across the workforce. It may be useful to consider how staff are rewarded for creative and outstanding ways of designing and delivering digital teaching and learning. Peer-to-peer learning can be an effective means of teaching digital skills and showcasing the work of 'digital champions' can be an effective means of shifting organisational culture.
191. To frame thinking and discussions about how a strategic approach to staff digital skills could be developed, Jisc's 'Digital at the core: A 2030 framework for university leaders' recommended that higher education providers ask themselves the following three questions:
- Are there examples of digital excellence among current staff, and how can we support more consistent sharing of digital expertise with colleagues?

- Is there a route to career progression through excellence in teaching that emphasises the effective use of digital tools, and is it held in the same regard as research?
- How can we encourage and embed a culture of experimentation and continuous improvement that lets staff make the most of digital tools in their work? ⁸⁸

Consider digital access and digital skills as interrelated issues.

192. Digital skills and access to the core items of digital infrastructure needed to study are closely connected. Figure 11 demonstrates how both digital skills and access to the core items of digital infrastructure need to come together for the student to effectively engage in digital teaching and learning.

Figure 11: A model outlining the relationship between digital skills and digital access



Chapter 5: Harness technology effectively

193. The coronavirus pandemic has rapidly accelerated the digital strategies of many higher education providers, with some reporting that projects or developments that were expected to take several years had been achieved in just a matter of weeks. The speed and scale of this change was not without its challenges, with a significant strain placed on systems and staff. We heard from several senior leaders, for example, that the experience had highlighted pre-existing inadequacies in the technology used and a need for greater investment in the digital campus. And we heard far more frequently that the entire transition would not have been possible without heroic – and unsustainable – efforts from staff.
194. In this section we outline how technology should be used in a way that enhances teaching and learning and results in a positive experience for students and staff. We also look briefly at potential opportunities created by emerging and established technologies that were highlighted during the review.

Higher education provider

‘In response to the lockdown in March 2020, we had to completely rebuild our virtual desktop facilities to enable everyone to access systems and software remotely, and initially that went badly. Unfortunately, staff access to critical services had to be prioritised to the detriment of students, until increased capacity was available. That is an example of a large, complex, digital infrastructure challenge that required specialised leadership, management and technical skills. This was one of many projects that put strain on our IT services and they struggled to cope with the demands placed on them.’

Strategic use of technology to enhance teaching and learning

Avoid overloading students and staff with a complex array of platforms and tools.

195. A clear message that came out of our interviews with students and student representatives was that students can find the volume of digital tools and technologies being used overwhelming, especially when this use varies across subject disciplines. In addition, some teaching staff told us that they felt switching between multiple technology platforms added an additional burden to their workload, and that the time this took up could sometimes be underestimated by senior management teams.
196. Results from a forthcoming Jisc survey suggest that many students find navigating their learning environment challenging, with only 45 per cent of students in higher education agreeing that their learning environment was easy to navigate. This percentage was slightly higher for students in further education (53 per cent).⁸⁹

197. One option for streamlining the range of tools and platforms available is to create a single space for students and staff to interact with learning data, resources, video conferencing and communities of learning.

Interviews with students' union representatives

'Multiple platforms were used to deliver content, it seemed to be at the whim of the lecturer/subject area.'

'Need to streamline platforms and have consistency across disciplines.'

'Software was switched during the lockdown and there was a lack of consistency which wasn't explained to students. Multiple platforms created confusion, students missed important messages and content.'

Ensure students and staff are equipped to use tools and technologies effectively.

198. The pandemic necessitated a rapid shift to emergency remote teaching and learning that has often led to some increase in student and staff familiarity with the technologies needed for digital teaching and learning (more on this in chapter 4, 'Build digital skills').
199. In the longer term, as further technologies and tools are introduced, digital skills training needs to keep pace so that students and staff are equipped to use the technology available to them. It is important that staff are given the time and space to engage with these tools, as, without sufficient time to explore, there will be limited scope to use these technologies to the best of their capacity. New technologies need to be accompanied by training, both at the time of launch and on an ongoing basis, to ensure that they become adopted and embedded in the day-to-day work of students and staff. As articulated in 'Alive in the swamp' (2013):
- 'when teachers are not taught how to use an innovation, how to adapt to the model, and provided with ongoing support, they revert to their traditional behaviours and practices. And, if professional development is stacked at initial launch, it risks neglecting the need for continuous reinforcement and upgrading.'⁹⁰
200. Professional development to support digital learning and teaching also needs to extend beyond teachers, students, and leadership teams. For example, we heard from multiple international providers with a significant proportion of students studying remotely and with all or almost all teaching and learning delivered digitally, that they viewed consistently high digital skills and training across all staff to be crucial for ensuring that off-campus students had an equitable experience to on-campus students.
201. Professional development also needs to be accompanied by technical support for staff if they encounter any issues with the technology they are using. Our polling

found that 36 per cent of staff did not have access to technical support when things went wrong while they were delivering digital teaching and learning.

Make strategic and well-informed decisions about which technologies to invest in.

202. Some members of senior management teams told us about the difficulty in choosing which tools and technologies to invest in. The value that the technology will add for students and staff is not always clear, and there is sometimes a disconnect between the products designed by education technology companies and the teaching and learning needs of staff. For this reason, it is important that decisions about the purchase of new technologies involve teaching and learning professionals to ensure they meet their pedagogical needs. These investments should be made with accessibility and inclusion in mind, as not all learners will benefit or engage with tools in the same way (see chapter 6, 'Embed inclusion').
203. We have also heard that investing in technological tools that are flexible is important, so that systems and tools can be upgraded and adjusted to fit with changing student and staff demands over many years. For example, the majority of higher education providers already had virtual learning environments (VLEs) as part of their digital infrastructure prior to the pandemic. In many cases these were primarily used as file repositories. The pandemic put pressure on these systems and has shifted the way they are used. Some staff saw this as a positive, noting for example that the capability of the systems had been improved through the embedding of video conferencing software. However, we also heard from concerns from teaching staff and learning technologists that the VLEs being used were severely outdated and no longer fit for the purposes they were being used for.

Simon Thomson, Director of Centre for Innovation in Education, University of Liverpool

'A challenge with most VLEs is the closed nature of their design. If we want students to invest time and effort in these spaces they need to be developed in a way that connects with the world beyond their educational digital experience. For example, a student on a photography course may already use Flickr for sharing their photos – why then, can they not connect their Flickr account with their institutional VLE account so that when they submit photos for assessment they can also share this to other connected personal/professional spaces at the same time?'

There is a need for better collaboration between higher education providers and the education technology sector.

204. We heard from several higher education providers that one of the reasons they are often prevented from large-scale investment in digital teaching and learning is that

procurement processes are burdensome and complex. Procurement processes need to become more rigorous and agile to reduce this barrier.

205. Rigid approaches to investing in and making decisions about technology at the senior management level can also contribute to an overly risk-averse approach that prioritises staying with platforms and tools just because a large investment was made many years or even decades ago.
206. Information asymmetries and a lack of communication channels also appear to be barriers to greater collaboration between higher education providers and education technology companies. From the perspective of technology companies, we heard that it can be difficult to know who to contact to discuss products they could offer. From the perspective of senior leaders, we heard that the array of products and technologies often felt overwhelming, and they did not know where to go to understand which technologies would best fit their intended objectives.

Opportunities

Explore the potential of emerging technologies for digital teaching and learning.

207. The current use of emerging technologies, such as artificial intelligence (AI), augmented reality and virtual reality, to support delivery digital teaching and learning in higher education is limited, even when established in other fields. However, there are exciting opportunities to explore how these technologies could be used to enhance the way that digital teaching and learning is designed and delivered. Emerging technologies have the potential to offer greater flexibility for students in terms of access to specialist equipment, and save time for staff through automation. In addition, the use of AR and VR has the potential to support higher technical and vocational education which has recently been identified as a government priority.⁹¹

Artificial intelligence

208. Several commentators have argued that the use of AI could drastically alter the way that education globally is delivered. UNESCO, for example, has argued that the potential of AI to offer large-scale personalised learning could be one way of accomplishing Sustainable Development Goal 4 ('ensuring an inclusive and equitable education and promoting lifelong learning opportunities for all') in its provision of personalised learning.⁹² An interim report of the Institute for Ethical AI in Education also highlighted that AI in education has the potential to 'increase the capacity of education systems and increase the productivity of educators', 'to provide valuable insights that can enhance teaching and learning, and support learners' well-rounded development' and 'to deliver autonomous learning recommendations'.⁹³
209. Automated essay marking tools are one way in which AI is already being used in higher education. As the interim report for the Institute for Ethical AI in Education noted, these tools have the potential to reduce the burden of marking on teachers,

and provide personalised, fast feedback for the learner. However, the report also notes several ethical risks with these tools that need to be carefully navigated. For example, the quality of teaching and learning could be reduced if teachers were 'systematically underutilised' and replaced with these tools.⁹⁴

210. Although not within the scope of this report, other research has highlighted the need for policymakers to consider how current incentives are affecting the development of the AI in education market. A recent Department for Education review noted that there are barriers to entry and growth that may be inhibiting the market from responding effectively to shifting demand.⁹⁵

Augmented reality and virtual reality

211. The use of AR and VR in higher education is currently limited. Jisc research from 2019 found that higher education providers that use either technology typically only have one or two departments with this capability.⁹⁶ Though usage is low in the UK, both AR and VR have the potential to strengthen and expand skills-based learning and training by creating virtual access to real-life scenarios that have historically been limited to specific specialisms or by access to specialist equipment. For example, computer simulations can recreate experiments many times over and parameters can be varied each time, to create an authentic experience while removing constraints related to space, safety, and limited resources.
212. AR and VR may also have some elements of learning analytics built in- such as response speed, task time and repeats needed - which can be used to personalise learning and link competence to performance. Currently these immersive learning tools have a high upfront cost in terms of specialist tools, such as headsets or smart glasses, post-production costs, and staff training to create content.

Dr Fridolin Wild, AR expert, The Open University

'The use of augmented reality in higher education is still at an early stage with pockets of innovation here and there. Medicine and life sciences have a lot to give and are potentially further ahead with this than other subjects. Anything that has a lot of 3D content, such as engineering, could also benefit too.'

Case study: Teesside University

Teesside University has developed a learning framework that places digital at the heart of learning design.

As part of this framework, staff in the School of Health and Life Sciences developed simulations as an alternative to accessing specialist facilities. Second year radiography students would normally be expected to undertake experiments using on-campus x-ray facilities. This year, experiments were carried out remotely using the university's simulation tool.

Prior to the experiment, students were asked to read a research paper, share findings and devise a spreadsheet to capture data for a rerun of the experiment using the simulation. The experiment session was delivered via Microsoft Teams, with the simulation displayed on the facilitator's screen and students directing the experiment and collecting the data.

The activity worked extremely effectively and was well received in student evaluation:

'This module has been the most useful one this year. It has been interesting being able to get an understanding of why we do what we do in practice.'

The external examiner commented that the level of guidance was exemplary and that students were 'able to develop a fuller understanding of the knowledge base and prepare them[selves] for their roles [as] practitioners of the future.'

Unlike on-campus delivery where the experiment can be dominated by one or two more confident students, the remote session meant that all students got involved. Despite the coronavirus crisis, 39 of 45 students submitted their formal assessment on time in May 2020 and the marks for the module were comparable with, and slightly improved on, the previous year.

The team is preparing to host familiarisation sessions with first year students and is also exploring the possibility of using the system in the nursing curriculum in the future.

Learning analytics can help to provide targeted student support.

Ian Dunn, Provost, Coventry University

'Learning analytics will allow us to better understand learner engagement and personalise learning journeys. Struggling students can be identified early and be given more support early on rather than this only becoming clear in the exam. We'll also use wellbeing analytics to support students and better understand their anxieties.'

213. Learning analytics are 'the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs.'⁹⁷ Learning analytics offer a data-driven approach to understand how students engage with their studies, which has the potential to help providers make strategic decisions about learning design and identify students in need of support.
214. Emerging literature from the use of learning analytics in the UK, US and Australia in suggests that predictive models could support the retention of students by identifying those at risk of failing or dropping out and aiding the use of personalised

interventions. Learning analytics can also be used for personalised learning, particularly in providing feedback for students, and early research also found that the use of student dashboards can help to develop closer relationships and engagement between students and teaching staff.⁹⁸

215. Several experts and senior leaders emphasised that while engagement measures, such as how many students have watched a particular video, can be useful, there is also a need to view these measures as part of a wider picture and not conflate them with evidence that a student has learned the content.
216. The presentation of performance and engagement data to students through learning analytics dashboards will vary between providers. There is some evidence to suggest that not all students respond positively to seeing their performance displayed in relation to their peers. Rather than providing lower-performing students with the motivation to keep pace with their peers, it can create a negative outlook, demotivating students further. Some experts also highlighted a risk that the predictions of student attainment become deterministic and serve to solidify previous poor attainment rather than act as a prompt for intervention.
217. As students engage with digital teaching and learning, much more data is generated, often in far less intrusive ways, than non-digital approaches. The additional information, properly utilised, can help further support and improve teaching and learning. There are opportunities to use data to support all six components of the model outlined in our introduction: richer sources of data can bolster learning design, support monitoring of digital access and inform interventions to improve inclusivity.

Case study: Nottingham Trent University

Nottingham Trent University has been using learning analytics for some time to monitor student engagement. It adapted the use of its learning analytics resource, the Student Dashboard, to meet the needs of its students facing the disruption of the coronavirus pandemic.

The Student Dashboard, developed with technology partner Solutionpath, is designed to help students to manage their own learning and enable university staff to better support students. It aggregates data about students' engagement with their studies and presents it in an easy-to-use format. Students receive a daily engagement score of high, good, partial, low or very low.

Learning analytics data was critical to providing support to students during the early weeks of lockdown. The university analysed engagement data and identified students with low or very low average engagement during the first fortnight of online teaching (in March 2020). Following this, 5,700 calls were made to students at risk. The university spoke to 2,300 individual students, 780 of whom requested further information or referral to further support about a range of academic, financial and wellbeing matters. Students were surveyed following the call campaign; 87 per cent of respondents (94) appreciated the call.

Lessons from the calling campaign included:

- Learning analytics require institutional systems to be effective and accurate; data flowing from systems must be correct and timely.
- Processes to produce the calling lists, manage call handling, make referrals and support the callers were complex and needed additional expertise.
- Some students required significantly more time and specialised support. The calls were a good starting point, but working this way requires further research and development.

In September 2020, Nottingham Trent University built on the calling campaign to improve the institution's response to low student engagement. 'No engagement' alerts are now directed to a central team, to reduce demands on personal tutors.

Recommendations

The technology used for digital teaching and learning should be streamlined and used consistently as far as possible.

218. When providing students with multiple tools and platforms to engage with digital teaching and learning, it can be helpful to avoid unnecessary complication by streamlining them. From the perspective of staff, limiting the number of tools and technologies to a small but effective selection can help to reduce workload and improve consistency in the way that tools and technologies are used across subjects and faculties (which also benefits students).
219. Consider creating a single space for students and staff to interact with learning data, resources, video conferencing and communities of learning. Having one portal for all students can help to enable a seamless transition for students who are moving between in-person delivery and delivery in a digital environment, and can also simplify the process of monitoring learning analytics data.
220. In doing so, leaders should avoid assuming that one size fits all. We heard strong calls from students and staff to be able to move through their digital environment seamlessly, and this may mean that not every preferred tool across the organisation can be used. There may, however, be compelling pedagogical reasons for using different technologies in some cases; consistency should not be at the expense of learning outcomes.

Case study: Coventry University

Coventry University Group is a multi-campus public research university which has been teaching online degrees for the last three years through a partnership with FutureLearn.

The pandemic has accelerated existing plans for the hybridisation of the digital and physical campuses. From 2021 students studying online degrees will also be able to access campus provision and their campus-based counterparts will be able to access FutureLearn modules. This hybrid approach prioritises the time students spend on campus towards tutorials and enhancement of the work they have already completed.

The Aula learning experience platform has also been crucial in the university's response to the pandemic. Aula is a mobile-first platform which focuses on lowering communication barriers and improving student engagement. Staff worked with Aula designers to transform existing curriculum to make 1,700 modules available to students. Communication on Aula is enabled through discussion channels, feedback given verbally through voice notes, and learning delivered with active engagement in different multimedia resources. The mobile nature of the platform means greater accessibility for all students, as well as the opportunity to collaboratively learn and codesign their learning experience.

Coventry University Group is accelerating plans to increase the digital connectivity of provision through more socially platformed, activity-based content to engage students with learning. It will also continue to invest in up-to-date simulation technology to enhance the student experience.

Involve students and staff in decisions about the technology that will be used.

221. It is vital to include the student voice when making decisions on which technology platforms and tools are used. Doing so helps to ensure that investment in technology delivers the greatest benefit to students' learning experience. Involving students who have accessibility requirements is essential, including consideration of students with low-bandwidth connections or unreliable internet access (see chapter 3, 'Ensure digital access').
222. The tools and technologies used also need to align with the pedagogical purposes of teaching staff. This means involving teaching staff who will be using the technology to design and deliver digital teaching and learning in decisions.

Foster a culture that is open to change and encourages calculated risk-taking.

223. Senior leadership teams need to build in time to reflect on whether the technologies and tools they have in place currently are fit for purpose and whether any alternatives would now be more appropriate. Regular and carefully structured reviews, combined with strong digital awareness about technology at the senior leadership level, will help to counter bias towards the status quo.
224. In seeking out partnerships with higher education providers, education technology companies also need to make sure that the products and solutions they are developing have been rigorously informed by the pedagogical needs of teaching staff in higher education providers, as opposed to developed in isolation.

Case study: The Open University

The Open University's OpenSTEM Labs enable students to remotely engage in authentic experimental and practical learning, which has been in operation since 2013. The OpenSTEM Labs provide an authentic learning environment, connecting students to instrumentation, data and real equipment for practical experiments and analysis over the internet, accessible from anywhere and at any time.

For remote-controlled activities users access real equipment through a web browser. They can book an online session, undertake an experiment or activity, send real-time control commands, monitor real-time performance and download data for subsequent analysis.

Remote-controlled activities include microscopes, instrumented engineering test rigs, lab-bench experiments and analytical instruments. Students can also remotely conduct experiments in environments including a mountain-top observatory in Tenerife, and use a robotic rover to explore a Mars-like landscape.

OpenSTEM Labs allows the university's distance learning students around the UK and globally to access an authentic practical learning experience. The Open university is developing formal access partnerships with other universities, particularly in view of the opportunity to rethink traditional practice following the disruptions of coronavirus.

Chapter 6: Embed inclusion

225. Digital teaching and learning has the potential to improve the inclusivity of learning environments, for the benefit of all students. To realise this, providers should ensure that inclusivity is built into their strategic approach to developing digital teaching and learning and is based on a thorough understanding of their students' specific needs.
226. In this section, we consider the immediate impact of the pandemic on accessibility and inclusion in digital teaching and learning, before outlining how inclusion can be embedded into digital teaching and learning in the longer term through the following three stages:
- a. Review and evaluate whether provision is inclusive and accessible.
 - b. Design inclusively, building a sense of belonging. This should be complemented with tailored support for individual students and particular consideration of the experiences and needs of underrepresented student groups.
 - c. Adapt safeguarding practices for the digital environment.

Lessons learned

Access and flexibility

227. The flexibility offered by digital teaching and learning enables particular student groups to access higher education who might not otherwise be able to (see chapter 1, 'What are the benefits of digital teaching and learning?'). Learning that comprises a mix of synchronous and asynchronous initiatives can provide flexibility while ensuring online communities for peer-to-peer support can become established and evolve. This balance between synchronous and asynchronous activities is also important because, while synchronous activities can help to ensure that students with digital access challenges are not excluded, it is also important that there is not an over-reliance on asynchronous activities as these can increase feelings of isolation and have a negative impact on mental health.⁹⁹
228. Where teaching and learning is delivered synchronously and not all students are able to join, there is a risk that some students may feel excluded from the online learning community they are a part of.

Student (via call for evidence)

'Living in an area of high risk, I am unable to physically attend university. This means I have access to lectures online but miss my seminars [...] I feel I am excluded from vital discussions.'

Adapting and extending the reach of student support services

229. There have been concerns about the nature and quality of student support services since the move to increased digital teaching and learning. Student support services have been under huge pressure since the first national lockdown began in March 2020, supporting students with a range of issues. Universities UK stated that demand for support ‘has doubled, and in some cases quadrupled’.¹⁰⁰ A survey of over 16,000 people carried out by Mind found that 73 per cent of university students said that their mental health declined during lockdown, and that students particularly struggled with moving back in with parents, being isolated from friends and a lack of university mental health support.¹⁰¹
230. While this has been an incredibly challenging time for student support services, some providers have found ways to use the digital delivery of support services to reach a wider range of students. For example, through our call for evidence one provider reported that its student services teams had seen more students attending study skills, careers and wellbeing sessions than would have been the case in person.
231. There is also a wealth of professional resources becoming available to advise those working in student support services on how to deliver their services as effectively as possible online. Through our call for evidence we heard of a careers service at one provider drawing on work by online dialectical behavioural therapists. Advisors from the careers services identified and adopted five behaviours for successful video work: picture, posture, eye contact, technology, sound. They reported that students seemed to find this method of support effective, and an appropriate and convenient alternative to an in-person meeting.

Challenges and opportunities

Reviewing and identifying the needs of students in a digital environment.

232. Identifying students’ particular needs can be challenging in a digital environment. The lack of non-verbal and small communication cues online can undermine the building of rapport and engagement.

Higher education sector body (via call for evidence)

‘Whilst everyone is getting more used to communicating in an online environment, it is more challenging for an educator to “read the room” and pick up non-verbal cues that demonstrate understanding or misunderstanding; this has many potential consequences but can be particularly challenging for disabled students or across different cultures.’

233. One option for identifying student wellbeing or engagement concerns in a more systematic way is through the use of learning analytics, which can complement

person-to-person interventions through student services or tutors (see chapter 5, 'Harness technology effectively' for more detail).

Case study: Multiverse (education start-up)

As all activity is now taking place digitally, Multiverse has been able to expand and automate many of its measures of its apprentices' engagement and performance.

These measures are relatively straightforward, such as lesson attendance, and have led to a much larger group of lead indicators to direct attention and interventions. The basket of measures that correlate with a higher risk of non-completion include training hours, employer feedback and attendance. The system collects and collates these measures and flags to coaches when apprentices have one or more risk factors. Data-informed automation is, however, always supplemented with human judgement, and coaches also collect and discuss detailed notes on a weekly basis in order to inform their prioritisation, support and intervention activities.

The combined approach creates a more effective safety net and instils a greater degree of objectivity – ensuring support goes to those apprentices who need it as well as those who are most willing to seek help.

Early indicators suggest that this system is leading to a meaningful improvement in student outcomes. Although Multiverse sees the in-person elements of its approach as central, it is 'certainly clear that there will be a much greater level of online integration' even after the pandemic subsides.

Design inclusively from the outset

234. While there is clearly an intention to create inclusive learning environments, we have heard through our call for evidence that there are knowledge gaps about inclusive learning approaches among staff. Furthermore, we heard in our interviews that technical developers do not always consider the needs of diverse learners when developing new services, and that procurement processes may not assess these factors with sufficient vigour.

Technology company (via call for evidence)

'Tools and platforms need to take into account the broadest possible range of student requirements. It is not acceptable to exclude some learners based on poor procurement processes or [...] development approaches that lack rigour and adherence to standards.'

235. It is also essential that students are engaged in the design and delivery of digital tools and technologies, and that they are able to feed back on whether the implementation of strategies and features to improve accessibility sufficiently meets their needs. There have been huge strides forward in embedding features to

support accessibility, but more needs to be done to ensure that the quality of these features is improved. For example, inaccurate auto-captioning has been a major problem for students.

London South Bank University

‘The use of captions (particularly if edited after the lecture) can be helpful to support some students, although cannot substitute for those students who need professional captioners. Similarly, the use of chat functions can be helpful for some students with disabilities, particularly with mental health conditions such as anxiety, which might impede confidence in contributing during in-person delivery. However, if not properly moderated, chat functions can exclude those with visual impairments.’

236. Furthermore, designing inclusively from the outset and ensuring that all content is accessible can benefit a range of students regardless of whether they have additional needs. A recent report from the Higher Education Commission found that digital content designed to be more usable for disabled students can benefit all students. For example, when course documents are produced in accessible file formats, they can be converted into podcasts.¹⁰²

Build a sense of belonging

237. Many responses to our call for evidence highlighted that a more inclusive and equitable learning environment (and improved student engagement among certain groups of students) had been one of the main advantages of the rapid switch to digital teaching and learning. There was broad agreement that some students who did not previously feel able to fully contribute in more traditional settings are significantly more engaged.
238. In particular, chat functions have enabled more questions and comments than in person. One-to-one and small group meetings held on videoconferencing software have also been welcomed by students who were ‘harder to reach’ and for whom the campus-based or office environment may have been intimidating.

Student organisation (via call for evidence)

‘Students have also told us that it is easier to ask questions online. For those who are not comfortable speaking, there is the option to comment in the comment section any questions you have, at any point in the lecture, without interrupting it. The online live captions available through MS Teams is a positive, and ability to pause and have time to take notes as well as re-watch.’

239. It is widely accepted that a sense of belonging is one of the most important factors in students’ success and retention in higher education.¹⁰³ In the context of the pandemic, many providers have, at short notice, had to create and maintain this sense using approaches new to their institution.

240. In November, a UK Trendence Research survey set out to understand whether students were considering dropping out, who was most at risk and the reasons that they were considering it.¹⁰⁴ It reported that one of the top negative responses focused on ‘a lack of interaction with other students’. On further examination it found that students were unhappy that current provision failed to provide social interaction. It compared results from a survey in May 2019 and found that only 50 per cent in October 2020, compared with 60 per cent in May 2019, felt part of a community of staff and students. In chapter 2, ‘Redesign pedagogy, curriculum and assessment’, we outline in more detail how course design can be used to tackle isolation and loneliness in a digital environment.

Case study: Southern New Hampshire University (United States)

Southern New Hampshire University places a lot of emphasis on fostering a sense of community, drawing on Gregory Elliott’s work on the importance of a sense of mattering. Paul LeBlanc described how staff and leadership ‘spend a lot of time thinking about how to communicate that “it matters that you are here” to students’, and creating a sense of belonging in doing so. These efforts are important for wellbeing – especially during a pandemic – and have academic benefits too, including improving student engagement and reducing dropouts.

The university’s academic advisers – who in some ways are more akin to life coaches – play a central role in engendering this sense of belonging among students. Supported by learning analytics tools (see chapter 5, ‘Harness technology effectively’), advisers proactively reach out to students to catch issues early and support them in finding solutions. For example, if a student seems distracted in class, an adviser will be in touch – the student’s ability to engage matters, and this feedback loop is designed in part to convey that to the students themselves.

Case study: Plymouth University

As an alternative to its pre-existing ‘Writing Cafe’, Plymouth University created a digital substitute that offers students the opportunity to meet virtually with student mentors who can offer support with academic skills such as writing and pastoral support.

Virtual breakout rooms were used to recreate the physical tables in the cafe, and the Digital Writing Cafe (like its previous in-person version) was student-led to create an environment that all students (in particular, students from disadvantaged backgrounds) felt welcome to join.

Moving the writing cafe to a digital environment increased student participation by 50 per cent. Staff believe this was because the online environment allowed

students greater flexibility, and also because it became more in demand as students were faced with the challenges of the coronavirus pandemic.

Student feedback has been highly positive and some students have commented that the Digital Writing Cafe had helped with feelings of isolation experienced during the pandemic.

After the pandemic, the Digital Writing Cafe will continue to run alongside the physical space. This will allow for non-commuter students, those studying at satellite campuses and other student groups to access the writing cafe, regardless of how they are studying.

Complement inclusive design with tailored support for individual students and student groups.

241. In developing an inclusive approach to digital teaching and learning, there is a need to pay close attention to how the experience of digital teaching and learning can differ for particular student groups, and the diversity of each cohort. There will also be a need to consider intersectionality, with some students identifying with multiple characteristics or groups. While this section is by no means comprehensive, we have considered a breadth of evidence about the varied experiences within and between particular student groups.
242. Our polling highlighted that particular student groups felt optimistic about the benefits of digital teaching and learning:
- Students who are parents or guardians are more likely than other students to think that every aspect of their course can be replicated online.
 - Disabled students are more likely than non-disabled students to think that every aspect of the course can be replicated online.^{##}

Disabled students

243. Disabled students have a wide range of experiences of engaging with digital teaching and learning, and these experiences vary depending on types of impairments and how accessible and inclusive provision is within higher education providers.
244. Digital teaching and learning presents an opportunity to improve the experience of many disabled students. In many cases, the shift to emergency remote teaching has brought about positive changes that disabled students in particular have been requesting for many years, such as:

^{##} This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

- An increase in alternative formats available digitally through learning platforms, and bolt-on accessibility tools to convert content to a format they can most readily learn from, such as the creation of an audio file for text-based content.
- Additional assessment choices being made available.
- Flexibility in the pace of learning, helping those with fluctuating conditions or medical time commitments such as hospital appointments.
- Flexibility in the place of learning – ways of engaging with teaching and learning materials that do not require being in a particular place (for those with physical impairments or fluctuating conditions), or a crowded space (particularly valuable for many students with forms of anxiety).
- Stronger weightings on pre-class work and alternative forms of assessment, which have benefited deaf students.

245. Before the pandemic, 26 per cent of 513 respondents to a survey of disabled students said they always or often felt excluded from social activities, societies and clubs because of a lack of disability awareness.¹⁰⁵ Our polling found that disabled students are less likely to feel that social interaction with other students cannot be replicated online (58 per cent compared with 70 per cent who are not disabled).^{§§§} This may reflect longstanding issues around social inclusion of disabled students. It may also suggest, to the extent that some may not feel that their social situation has drastically changed as a result of the pandemic, that the digital environment could provide new avenues to help build relationships with peers.

246. Through the evidence gathered in this review, while we found evidence of the benefits of digital learning and teaching being realised for disabled students, it is clear that the speed with which the shift to digital teaching and learning had to take place often meant that the needs of disabled students were not considered as fully as they could have been. The main issues for disabled students with digital teaching and learning are best summarised by the Disabled Students' Commission's response to our call for evidence.

^{§§§} This data includes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Disabled Students' Commission response

During the early phase of the pandemic:

- 'Students with visual or hearing impairments particularly reported facing severe challenges.
- 'Disabled students who relied on assistive technology also faced additional barriers due to compatibility issues in either hardware or software.
- '[There was a distinct] lack of accessibility tools and a prevalence of learning materials in inaccessible digital formats.
- 'There were delays to diagnostic screenings for Disable Student Allowances, and disruption to Disable Student Allowance funded specialist services, support networks and health provision.'

247. In addition, we are aware of a range of concerns which were raised through the call for evidence or noted in relevant reports. These specific issues are explored in paragraphs 248 to 251).
248. Needs assessments may have not been updated for online delivery, and learner support agreements or support put in place could be more difficult to enact tangibly via online delivery. For example, those with physical impairments are sometimes without access to their reasonable adjustments such as scribes – a particular issue during exams – or to orthopaedic adjustments including to chairs and desks.
249. A report from the National Association of Disability Practitioners (2020)¹⁰⁶ reported severe problems with a limited number of disabled students with sensory impairments being requested to take leave of absence when staff were unable to make courses accessible. They noted that many student complaints and concerns appeared to be closely aligned with impairment-specific issues.
250. Some disabled students had issues with reduced structure in the release of learning materials, with a great amount of 'content-dumping' onto platforms. The natural lack of boundaries of the 'volume of material' without careful staging could feel overwhelming.
251. The high degree of multi-tasking involved with online conferencing and use of multiple platforms could be challenging for some disabled students.¹⁰⁷ The National Association of Disability Practitioners has published resources on supporting neurodiverse students.¹⁰⁸

Higher education organisation

‘Some students face more challenges to engagement than others. For example, neurodiverse students may find it more difficult to study for long periods virtually as screens are harder to focus on than classrooms due to fewer points of focus.’

252. We know that certain practices may be useful in considering the needs of students with mental health disorders, in particular anxiety. We heard reports of some students who did not want to turn on their camera and show their home environment, as well as those who found it easier to participate actively when they could see others. To ensure participation, some teachers chose to invite and encourage students to participate with their cameras on, while making it clear that doing so was not obligatory. Similarly, encouraging blurred backgrounds was also suggested as a useful tool.
253. In a 2019 OfS insight brief, ‘Beyond the bare minimum: Are universities and colleges doing enough for disabled students?’,¹⁰⁹ a range of elements was highlighted to enable positive progress in inclusive practice, including some related to digital teaching and learning. The Disabled Students’ Commission also set out recommendations in its ‘Three months to make a difference’ report (2020).¹¹⁰
254. The OfS has published a range of case studies to highlight some of the ways in which providers have responded to the needs of disabled students during this time.¹¹¹ This includes a set of principles developed by the University of Leeds to ensure that online assessment is accessible to a wide range of students with protected characteristics.¹¹²

Students from minority ethnic groups

255. In a guide for providers, Dr Gurnam Singh (Fellow in Race and Education, University of the Arts London) set out six points to tackle the most pertinent issues for students from minority ethnic groups during the pandemic.¹¹³ Dr Singh explained that the existing barriers that students face can both play out and also be differently addressed in an online environment. The report also highlighted the benefits that digital teaching and learning could bring to tackling unconscious bias. There is a large body of evidence confirming that students from minority ethnic groups face a variety of conscious and unconscious bias in traditional classroom settings.¹¹⁴ This pernicious issue can, not least, result in significant gaps in attained and awarded qualifications for these students. Dr Singh noted that the move to online learning offered an opportunity to counter this issue by developing, designing and implementing strategies for promoting equitable learning environments, supported by real-time data and feedback from staff.
256. Dr Singh’s guide also offered some practical tips to help educators build a sense of community online in an inclusive manner, such as using non-threatening ice-breaker activities and involving students when establishing ‘ground rules’ for online interaction.¹¹⁵

International students

257. Digital teaching and learning can offer significant opportunities not only to provide flexibility for international students studying with UK providers, but also to improve the quality of the learning experience.

Education company (via call for evidence)

‘Supporting students with lower English language skills, evidence suggests that online resources help with revision of lectures, practice and generally provide a safe space for international students to look for help (studies have shown that some groups of international students are less likely to ask in-person questions or ask for help from tutors).’

Higher education sector body (via call for evidence)

‘For international students for whom English is not their first language, the “listen again” facility of digital teaching and learning may support their learning as they can go through sessions multiple times.’

258. The most pressing challenge for international students has been around access to synchronous teaching and learning in different time zones.
259. Good practice may involve starting with the assumption that all materials must be available online, asynchronously, including recordings of ‘synchronous’ aspects, alongside a vibrant and moderated platform which encourages all students to engage with each other and their learning. For example, over the summer, University College London rolled out an education model based on remote learning and appointed connected learning leads in each department to implement this model. The basic idea was a ‘digital first’ approach based on ease of access. This meant that core material was largely available in an asynchronous manner to help students in different time zones and with different levels of access to computers and the internet.

Adapt safeguarding practices for the online environment

260. The digital learning environment is distinctly different from on-campus interactions in more open, neutral, professional spaces. Students and staff are often working in their home environments, which presents a range of ethical and safeguarding issues such as disclosure and consent of information about a person’s circumstances. Quite simply, it is harder to control what information about domestic circumstances and private lives is shared when transmitting directly from that environment.
261. These types of issues, along with a lack of the inherent formality associated with a professional environment, and the sometimes subtle power dynamics between

students and staff, can create a precarious situation in which students can become more vulnerable to safeguarding issues.

262. The digital environment also creates additional avenues for communication which could be abused and used to harass or cyberstalk by peers as well as by staff, and may act as a psychological 'buffer' that causes perpetrators to behave in a more extreme way than they might through in-person interactions.

Dr Emma Short, Associate Professor, De Montfort University

'There is data showing an increase in online harassment in the general population, post-Covid. The evidence of the rise in cyberstalking came from making comparisons to figures reported to helplines or reporting websites. We were fortunate that those organisations shared that information with us [...] The most significant rises were reported by the Report Harmful Content, Revenge Porn helpline and the National Stalking Helpline.'

263. Plan International has published research involving a survey of 1,000 women and girls aged 14 to 21 across the UK,¹¹⁶ which highlighted that during the lockdown period alone, one in four respondents (25 per cent) had experienced at least one form of abuse, bullying or sexual harassment online.
264. Reference to the risks in moving learning online were made by Dr Anna Bull from the 1752 Group, a UK-based research and campaign organisation dedicated to ending staff sexual misconduct in higher education. Drawing on data from interviews with students who had been subjected to sexual misconduct from staff in higher education, she described the following.

Dr Anna Bull, The 1752 Group

'There is evidence of staff sexual misconduct in digital spaces, including social media, even before Covid-19 moved teaching and learning online. This online sexual misconduct can take various forms, including "grooming" by staff towards students (or towards other staff) whereby boundaries between the professional and the personal are gradually blurred and students are drawn into sexualised conversations. It can be difficult for students to recognise such boundary-blurring behaviours as misconduct at the time they are occurring. In addition, despite the imbalance of power, students can feel complicit in such boundary-blurring behaviours, for example because they have felt they need to reply to messages from their lecturer.'

265. Providers should have in place and promote robust mechanisms to manage online environments, to inform staff and students of good practice and common expectations, and to report and deal with any forms of harassment or hate crime.
266. The University of Suffolk created a self-review tool for online safeguarding, focused on tackling sexual violence, hate crime and online harassment. The tool is designed

for higher education institutions to self-review their online safeguarding practice.¹¹⁷ The university created this resource as part of a project funded by the OfS Student Safeguarding Catalyst programme.

Recommendations

Review and evaluate whether digital teaching and learning is inclusive and accessible.

267. Students, in particular those from underrepresented groups, should be able to give feedback on how inclusive and accessible their learning environment is.
268. Staff should feel equipped to use student feedback and other information to establish how inclusive the learning and teaching environment is, and empowered to make improvements.
269. A useful starting point can be to first reassess the needs of those students who may be known to be particularly vulnerable to some of the effects of the pandemic or the change to delivery methods, as well as those who already had additional support needs.
270. Following this, a general 'check-in' should be made with each student to assess their level of digital access. As outlined in chapter 3, 'Ensure digital access', one of the recommendations of this report is that providers offer practical support to students experiencing digital access challenges and work with students to create individual action plans to mitigate these challenges. This dialogue will also provide an opportunity for enabling staff to understand the variation and reality of students' circumstances to allow them to tailor delivery for high levels of inclusion.

Higher education provider (via call for evidence)

'We need to have cross-institution discussion with our student body and with our academic, administrative and professional service colleagues to build on what we have learnt from this experience and create a model that is inclusive and meets the needs of working people.'

271. It will be important for universities, colleges and subject communities to collaborate to share learning, to identify issues that might have a common solution and ultimately to accelerate progress. In doing so, there should be involvement and partnership with the particular student groups in focus.

Case study: Solent University

Solent University created a team of six students who were employed on a part-time basis to review the accessibility and inclusivity of modules being delivered digitally.

During August, the team reviewed a total of 105 modules prepared by academics for digital delivery in the autumn term. For each module, the team members recorded their reflections on a feedback sheet, identifying three strengths, three weaknesses and three recommendations for improvements to create a more inclusive, accessible and usable module.

Staff were appreciative of the student input and were able to use the feedback to inform the design of student-centred and inclusive digital teaching and learning. Feedback from students on the shift to digital learning and teaching has been largely positive at Solent University, with most students indicating that their modules of study in the autumn term were inclusive and accessible.¹¹⁸

Good inclusive practice (in the context of digital delivery) identified by the student team's review process has been shared across Solent University and disseminated via a series of 'Tips for staff from students'.

In addition to providing input on digital teaching and learning activity in courses for the spring term, the student team is also supporting teaching staff to deliver co-created digital projects related to the courses they study (for example careers events and exhibitions of student work).

Design inclusively and complement this with tailored support for individual students.

272. Inclusive, accessible design should be seen as the default for all digital teaching and learning.¹¹⁹ Staff should have the confidence and skills to embed this into the learning environment.
273. Higher education providers should upskill student services to ensure that they can effectively both directly support students and also advise those designing and managing learning environments. This means that those delivering learning, teaching and assessment can better understand requirements and draw on good practice.

Accessibility consultant (via call for evidence)

‘We heard that one of the core challenges is that disability support teams are often much more skilled on face-to-face support than they are on digital accessibility, as such upskilling of key student services so that they can effectively support students in a digital environment is vital’.

274. Technical requirements to ensure accessibility and inclusivity of learning, teaching and assessment should be clearly considered through new procurement exercises and met through existing service-level agreements.
275. Students should be informed and empowered to understand what avenues they can use to raise or report inaccessible or non-inclusive provision, and the steps that will be taken to address their concerns. This should be done without fear of reprisal and with appropriate support. These mechanisms will be an important component in ensuring a strong student voice in the design of digital teaching and learning (see chapter 7, ‘Plan strategically’).
276. Particular attention should be given to considering the needs of particular student groups, given the changes to delivery of teaching and learning. Providers have responsibilities under the Public Sector Equality Duty (2011) and the Equality Act 2010, in particular, to advance opportunity of equality for protected groups.¹²⁰

Adapt safeguarding practices for the digital environment.

277. Effective safeguarding practices should be in place and promoted to tackle online abuse, including harassment, racial hate and sexual misconduct. It is important that existing policies are reviewed to sufficiently take account of the impact of the online environment. This may include:
 - a. Clearly establishing expectations with staff and students about online behaviours.
 - b. The use of protocols – for example, if sharing confidential information with students, to check that they are alone or have headsets on.
 - c. Ensuring that staff understand how and where to raise concerns should they become aware of particular safeguarding issues in a students’ domestic environment, and how to report and record any incidents.
 - d. Ensuring that students understand what they can do if they have any issues and how to report incidents in a safe, supported and informed manner.

Chapter 7: Plan strategically

278. There is a common and perhaps intuitive claim that delivering digital teaching and learning is dramatically cheaper than in-person teaching and learning, and in some cases this is true.¹²¹ However, the vast majority of interviewees and respondents to our review argued that, if anything, delivering digital teaching and learning was more costly.¹²² Although there are opportunities to make savings, in the short term at least, digital delivery does not appear to be a cheaper alternative. There is a case, made throughout this report, that digital teaching and learning can enhance and promote greater public value – whether through better learning outcomes, facilitating higher quality engagement with learners, or improving the system’s resilience in the face of future shocks.¹²³
279. As with any organisational change, strong and supportive leadership is critical and the providers that have had the most success with digital teaching and learning have been those where both senior leaders and staff across the organisation understand the value of digital teaching and learning and are invested in its success. Adopting a coordinated approach to the design and delivery of digital teaching and learning leads to stronger results when compared with a piecemeal approach.

Lessons learned

High-quality digital teaching and learning requires significant investment, and the benefits are likely to be realised over the long term.

280. We have heard consistently from digital teaching and learning experts and senior leaders that designing high-quality, activity-orientated digital learning has a high cost in terms of: teaching staff time to develop learning activities and engage with relevant training; investment in and maintenance of technology; and updating learning resources and hosting costs for platforms. We also heard how high-quality digital teaching and learning not only requires the development and training staff (see chapter 4, ‘Build digital skills’), but also the creation of fundamentally different types of role. To fully capitalise on the pedagogical opportunities and new forms of interaction presented by digital tools, providers will need to create new jobs like learning technologists, online coaches and facilitators, and real-time content curators. Some of these roles already exist or represent the continued evolution of roles today – librarians were cited as being in a state of perpetual innovation – and others will be brand new.

**Lynne Downey, Vice Principal Digital Education and Professional Services,
University College of Estate Management**

‘High-quality digital teaching and learning requires the same, if not greater, investment of staff time as on-campus delivery. There is a significantly longer lead time needed prior to delivery of the teaching and learning to enable online courses to be developed and built by a highly specialist team of digital experts. These include education technologists, learning designers, editors, media producers working in collaboration with academics who not only have subject matter expertise in their chosen field but can also demonstrate competence in online pedagogy.’

Higher education provider (via call for evidence)

‘Providing high-quality digital teaching and learning is not a low-cost alternative to campus-based learning.’

281. There are mixed opinions across the sector on whether economies of scale could be realised in the future. Research suggests that the idea of drastically increasing student numbers at equal or lower cost may be a perception rather than reality, as the costs involved in supporting high-quality digital teaching are high.¹²⁴ A study surveying teaching staff from over 100 US institutions in 2017 found near-unanimous agreement that the instructional design, course materials and specification of courses delivered exclusively in a digital environment cost at least as much to develop as courses designed for in-person delivery.¹²⁵
282. Some believe that the repurposing of modules or sharing across disciplines could offer some efficiency savings. Efficiencies may also be found in staff time: academics at Georgia Tech, for example, have developed an ‘AI-powered sociotechnical system’, saving teachers over 500 hours of work across several courses.¹²⁶ There are also savings that can be realised through reduced need for physical classroom resources and repurposing parts of the physical campus for other activities. We also heard that the move to digital teaching and learning highlighted how providers could effectively: increase interconnectivity with international partners without the need to travel each time; reduce reliance on printed learning materials; and reduce commuter emissions. All of which could have positive ramifications for supporting universities to meet UN sustainable development goals and financial efficiency agendas.
283. The consensus from our interviews with senior leaders was that any cost savings are unlikely to be realised in the short term. One provider leader told us it was ‘likely to be 10 years’ development before there will be significant cost savings’. Due to the scale of the investment required and the timescale over which the benefits will be realised, providers need to take a long-term strategic view to successfully implement high-quality digital teaching and learning infrastructure.

Expectations about learning principles and design need to be set at a leadership level while allowing for localised innovation.

Professor Iain Martin, Vice-Chancellor of Deakin University (Australia)

‘Deakin takes the view that the principles of good learning are universal. They should guide learning design in every mode of learning. When we design a new unit, it’s designed with cloud students in mind first and on-campus in addition to that. That means it focuses on the pedagogy, what you want to achieve and outcomes from it [...] We talk a lot about our cloud campus in Deakin and we do that deliberately to give parity of esteem for cloud students.’

284. There needs to be a clear and consistent set of standards and expectations across programmes and courses in terms of pedagogy and learning design. While there are a range of digital tools and approaches that can enhance both in-person delivery and delivery in a digital environment, the use of different platforms and tools and lack of consistency can be overwhelming for students and staff and can exclude certain students (see chapter 5, ‘Harness technology effectively’).¹²⁷
285. We heard how much of the success in moving to predominantly digital delivery was because of proactive innovation at department and programme level. It is therefore important that any principles developed to support the strategic use of digital tools, and learning and design principles, are flexible and do not serve to disempower or stifle this localised innovation.

Case study: University of Exeter

In response to coronavirus, the University of Exeter established Project Enhance, which takes a ‘people and pedagogy first’ approach with the ambition of enhancing learning, teaching and student support in the immediate and longer term. The project sought to balance consistency across the institution with departmental autonomy, with respect both to supporting people and to achieving pedagogic integrity.

Anticipating the demands on staff capacity and digital capability, the university recruited and trained 107 current student interns as digital learning assistants and 69 recent graduates as full-time digital learning developers, invested additional time for postgraduate research students, and appointed digital education specialists in anticipation of demands of teaching staff time. Academic colleges defined the mix of these roles that best matched their needs and context.

With respect to pedagogy, the project developed institutional design principles for blended and online learning environments, particularly emphasising accessibility and inclusion. Departments then developed teaching and learning norms, applying the design principles to their specific contexts. This approach

aimed to support quality assurance and promote consistency, while encouraging innovation and empowering colleagues as the experts within their disciplines.

Academic colleges have responsibility for quality assurance, which is largely based on supportive peer-to-peer approaches and light-touch 'checklists' to avoid over-burdening colleagues. The project also sought regular feedback from students, including through twice-termly pulse surveys of all students and student representative structures. Weekly meetings between the central project team and directors of education in all departments were found to be particularly effective in enabling continuous improvement through reflection on ongoing student and staff feedback.

Long-term opportunities exist for higher education providers, even where in-person delivery remains the principal mode of teaching and learning.

286. Jisc's survey of executive leaders responsible for learning and teaching showed that prior to the pandemic, the dominant mode of delivery was in person, with some online elements. Over the next 10 years, these leaders anticipate that their provision will move to a much more blended approach to teaching and learning.¹²⁸ A survey by Times Higher Education in May 2020 with university leaders across the world reflected these findings, as the vast majority agreed that their experience of online teaching during the pandemic will increase their use of blended learning over the next five years.¹²⁹
287. While some responding to the call for evidence were keen to resume in-person delivery of teaching and learning, and others had taken decisions to revise their approach, all found great potential for using digital teaching and learning in the future.

Dr Christine Rivers, Director for Learning and Teaching, University of Surrey Business School

'We needed to adapt and be liberated in a way from the old university approach that seemed to be stuck. However, this is not to say that there is not a place and time for classical lectures [...] The future is active digital design for us and potentially the purposeful use of AI and data analytics.'

288. In our polling, 63 per cent of students said they would like at least some element of online delivery to continue once the pandemic is over.^{****} Research by Wonkhe and Pearson found that over 80 per cent of students surveyed agreed that they would like recorded lectures to continue and 79 per cent of students surveyed would like to retain online tutorials or check-ins with tutors.¹³⁰ This research suggests that demand for components of digital delivery within programmes is likely to continue

^{****} This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

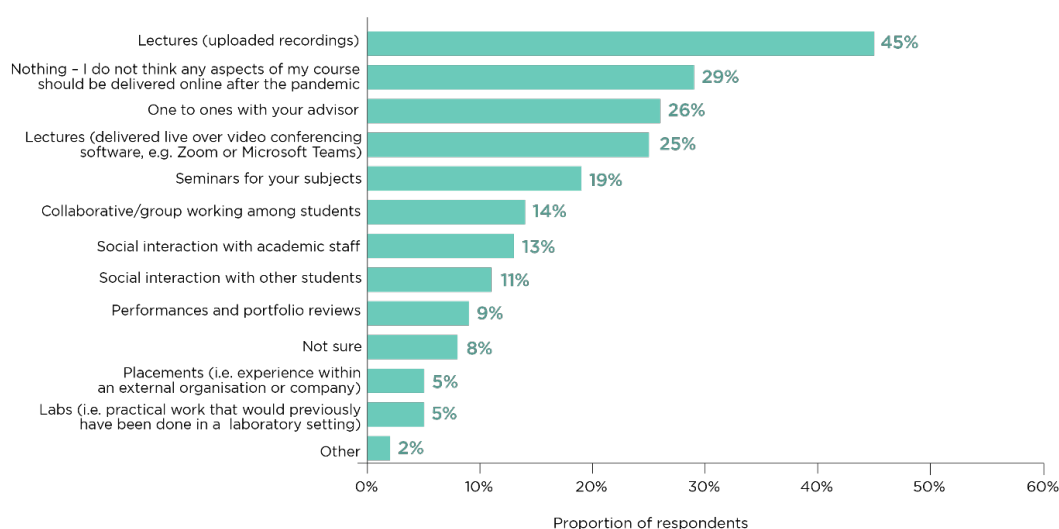
from significant proportions of the student population, and providers will need to consider how to deliver.

Higher education provider (via call for evidence)

‘We still have a lot to learn. However, we are clear [...] that “in-person” sessions in the evening are a core part of our institutional identity and important to many students. However, we recognise that many students are beginning to appreciate the flexibility provided by online teaching delivery [...] All students need to have access to a high-quality virtual learning environment that supports their studies. We need to have cross-institution discussion with our student body and with our academic, administrative and professional service colleagues to build on what we have learnt from this experience and create a model that is inclusive and meets the needs of working people.’

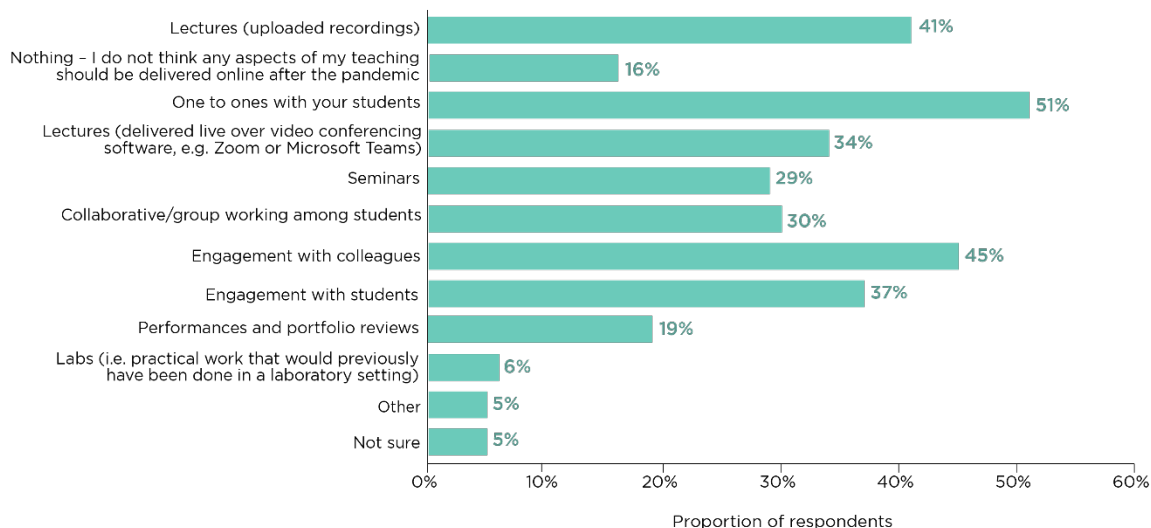
289. In our polling, teaching staff were most likely to cite one-to-ones with students (51 per cent) and engagement with colleagues (45 per cent) as the aspects of digital teaching and learning that should remain. A Times Higher Education survey of university staff found that 76 per cent of respondents would like online meetings to continue after the pandemic, and 54 per cent of respondents would like online lectures to continue.¹³¹ This suggests that teaching staff will expect significant changes to ways of working and that there is appetite for at least some aspects of digital delivery to remain.

Figure 12: Which, if any, aspects of your course should your university continue delivering online once the COVID-19 pandemic is over? (Please select all that apply) (students)



Note: Source of data is YouGov polling conducted for this review. This data excludes some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online.

Figure 13: Which, if any, of the following you would like to continue to deliver online once the COVID-19 pandemic is over? (Please select all that apply) (teaching staff)



Note: Source of data is YouGov polling conducted for this review.

Recommendations

Ensure a strong student voice informs every aspect of strategic planning.

290. Throughout this report, we have discussed the importance of involving students in designing high-quality digital teaching and learning. According to the 2021 Jisc digital experience insights survey, only 36 per cent of higher education students agreed they got the chance to be involved in decisions about online learning, compared with 50 per cent of students in further education, suggesting that student involvement seemed to be stronger in further education than in higher education at the time.¹³² In the move to delivering emergency remote teaching and learning, we heard about the rebalancing of student and staff engagement. Many recognised the value of engaging students in designing digital learning for their own courses and programmes, as well as overarching design principles.

Engineering Professors' Council

'The rapid changes brought about by Covid-19 meant that a great deal of innovation happened very quickly. This represented a fundamental shift in staff-student relations, as we worked together to find formats, processes and interactions that worked. However, because of the enormous workload that was happening and concerns that student expectations should be managed, this flux has not yet led to a transformation in "students-as-partners" approaches.'

Professor Neil Morris, Interim Deputy Vice-Chancellor: Digital Transformation, University of Leeds

'There was really good evidence of engagement with students at that time and the relationship between staff and students became more equal and balanced. It was a levelling moment for everyone, which will hopefully have a lasting impact.'

291. This strong engagement should continue and providers need to ensure students are engaged and have a voice in decision-making across the institution. Senior leadership teams can set a precedent by ensuring a strong student voice across strategic decision-making is a core component of organisation-wide principles for the use of digital technology, including in learning design. Areas at delivery level where we have identified that student co-design is essential, such as course design and platforms, will be heavily influenced by decisions taken at a strategic level. Students therefore need to feed into these strategic decisions for their input at delivery level to be meaningful.

Case study: University of Lincoln and University of Lincoln Students' Union

The University of Lincoln worked in partnerships with its students' union to establish a student teaching and learning experience panel. This was done to ensure a strong student voice to influence the development and delivery of online teaching practice.

Over 30 students have been recruited from across a wide range of disciplines, backgrounds and undergraduate and postgraduate courses, including some with additional needs. This collaborative approach builds on existing student voice mechanisms to ensure that all programme leaders consult regularly with their student groups. Partnership working through committee work ensures consistency of approach and staff engagement at all levels. Students are recruited and trained to participate in panel activities and chair panel discussions. From July 2020, multi-disciplinary student panels meet bi-monthly to enable regular feedback. Through these panels, the university receives regular student insights reports on important issues for online learners, such as digital accessibility. Interaction between staff and students has also changed individual staff practice. At a

strategic level, student panel members report to university committees and senior leadership team, impacting, for example, on the university's plans and interventions to enhance digital accessibility practice.

These arrangements are strengthening student voice mechanisms overall. This staff-student partnership has been a valuable driver for student development and creative tool for informing the university with a collective student voice to guide improvements to practice through a period of major change.¹³³ A review will take place to embed practice further.

Vice President Education Georgia Petts, University of Lincoln Students' Union, co-created this panel approach and commented:

'Students have developed confidence in sharing feedback and chairing panels, the soft skills that have grown through these panels is evident through increasing student involvement. Giving students the opportunity to feed back into proposals directly impacts their teaching and learning environment and empowers them to work with their academic staff members.'

Embed a commitment to high-quality digital teaching and learning in every part of the organisation.

292. Commitment to high-quality digital teaching and learning needs to be embedded at every level of the organisation. The Education Technology Action Group found that adding technology into existing practices is not an efficient approach. Instead, the whole approach needs to be examined, as simply adding technology to existing practices is expensive and can often result in missed opportunities.¹³⁴ For many higher education providers, the pandemic has meant that they no longer view digital teaching and learning as an add-on, but as an integral part of the organisation, which needs to be incorporated into every part of their offering. Providers need to take a whole-system approach to deploy this successfully.
293. Responses to our call for evidence and interviews also emphasised that the senior management team need to be invested in the success of digital teaching and learning. Jisc noted that provider leaders 'need to identify, invest in and champion their vision and a strategy for technology-enhanced learning that can adapt to change and uncertainty.'¹³⁵ Engagement with digital at a senior leadership level is required to integrate it into strategic and investment decisions. It is no longer sufficient to have a single 'digital champion' to front initiatives or inform decision-making. All senior leaders need the understanding of, and ability to champion, all aspects of digital teaching and learning, to bring about change across the organisation as a whole.

University of Southampton

The University of Southampton established a Common Framework for Online Education¹³⁶ to support the redesign of programmes for online learning.

The framework is firmly embedded in the university's own core values and strategy and sets clear expectations for learning delivery. It aims to support development of the online environment across the university and develop knowledge and skills to deliver effective teaching remotely. Developed in collaboration with both staff and students, the framework has been formally adopted as the university standard for all online delivery.

The framework focuses on the importance of student-centred learning practices that are inclusive and accessible for online learning. Work is now underway to further develop the framework in collaboration with staff and students.

It will support future planning for teaching and learning aligned to the framework and inform what technologies the university should invest in, whether that be for in-person, blended or fully online learning.

The development of the framework itself highlights how increased partnership and co-creation with students enriches teaching and learning delivery. Student involvement from the outset was essential to ensure the framework was fit for purpose to enable a shared and connected learning experience at the university. Working with colleagues in context enables them to retain ownership of their teaching, while supporting them to adapt it for the online environment. An important consideration in designing online learning is to provide a range of flexible access points for students, in order to ensure they can all engage with their course and their learning community successfully.

Avila Chidume, Vice President Education and Democracy, University of Southampton Students' Union said, 'I absolutely love all the work which is being done, and it's so great that it's so student-centred and focused.'

Reflect on the approach to the digital campus and the physical campus

Dr Clare Saunders, University Director of Learning and Teaching, University of Greenwich

'Blended learning also enables a fresh approach to the use of university estates, enabling a more focused and effective use of this invaluable but limited resource [for] those aspects of university life which add greatest value by being provided on site.'

Higher education provider (via call for evidence)

‘Campuses will be for student experience and not for housing professional services and [teaching] staff but for student interaction and social events.’

294. The experience of the pandemic has prompted a rethink of how physical estates are used, and there is now likely to be a shift towards using physical estates for activities that add the greatest value by being on site. Investment in the digital campus has been historically overlooked. Jisc reports for example that anecdotally, for every £1 invested in technology and digital infrastructure there is around £10 invested in the physical campus, highlighting the significant inequity between investment in the physical and digital campuses.¹³⁷ We have heard how some providers plan to move to a more blended offer, and others plan to return to predominantly in-person teaching. However, even where providers plan to return to in-person teaching, they plan to retain aspects of digital teaching and learning. In all cases, senior leadership and management teams will need to proactively reflect on their long-term approach to digital teaching and learning and consider how that feeds into long-term investment plans for their digital and physical campuses.

Jisc, Learning and Teaching Reimagined: Change and challenge for students, staff and leaders¹³⁸

‘Adapting the university offer through technology-enhanced learning and teaching is a strategically important issue that needs to be a central concern at senior leadership level. This requires an understanding of the digital maturity of the institution and, possibly, a change of investment focus. Historically, significant investments have been made by universities into their physical estates. There is now a much greater need to recognise the importance of investing substantially in their digital estates – which encompass hardware, software and connectivity infrastructure, and staff, digital training and course design – to enable learning and teaching capabilities.’

USP College

USP College, a further education college in Essex, has invested in immersive classrooms that connect two groups of students across its two campuses. The two classrooms are equipped with multiple cameras and immersive technologies like linked interactive whiteboards. This has enabled the college to improve parity of provision across the two sites, with students in both locations benefiting from teaching that could not otherwise have been delivered in person.

Dan Pearson, principal and CEO of USP College, has commented that in the longer term his vision is for a ‘national network of these [immersive] rooms, where resources and staff can be shared.’ On the benefits of these classrooms for the college, he commented that ‘It [immersive classrooms] saves money, makes the

most of expertise, solves the teacher shortage problem, enables curriculum expansion and the students love it.¹³⁹

Annex A: Methodology

1. The findings of this report have been informed by evidence gathered via four research streams: a literature review, a call for evidence, interviews with a range of stakeholders and experts, and polling. Through these streams, we have sought to understand the varied experiences, lessons and perceptions that have emerged during the pandemic, as well as the extensive wealth of knowledge that existed previously.

Literature review

2. Starting in July 2020, we began a review of the existing research available on digital teaching and learning, as well as research that looked at on how the delivery and design of digital teaching and learning had shifted as a result of the response to coronavirus from March 2020.
3. We continued to review relevant literature throughout the project, and all resources that are explicitly referenced in this report can be found in the 'Bibliography' section.

Call for evidence

4. On 3 September 2020, we launched a call for evidence to gather responses from a wide range of stakeholders across the higher education sector. The call for evidence posed a range of questions from immediate reflections to longer-term views, and respondents were invited to share challenges as well as successes, with the goal of sharing lessons with the sector and beyond.
5. We were pleased to receive around 200 responses to the call, including from students, leaders, educators, technology companies and sector bodies. We are deeply grateful to all those who took the time to share their views with us. Extracts from these responses have been included throughout the report, sometimes anonymously.
6. As part of this call for evidence, we hosted roundtables on digital teaching and learning with the following organisations: Universities UK, the Association of Colleges, GuildHE, the Open University, Independent HE, the University Alliance, EDUCATE and Emerge Education. All of these events made a significant contribution to our thinking, and we're grateful to all these organisations for their help in making them happen.

Interviews

7. We conducted individual interviews with stakeholders in three broad categories:
 - a. Students and student representatives.

- b. Experts in digital teaching and learning, such as learning technologists and academics with expertise in online and blended learning pedagogy.
 - c. Senior leaders in higher education providers who had oversight for the rapid shift to emergency remote teaching following the national lockdown in March 2020.
8. We asked interviewees a broad range of questions related to their experiences of and attitudes towards digital teaching and learning.
 9. We would like to thank everyone who contributed their time to these interviews. A full list of everyone we spoke to can be found in the 'Acknowledgements' section of this report.

Polling

10. Polling for this report was conducted by YouGov, which surveyed 1,285 students and 567 teaching staff from higher education providers in England.
11. A weight scheme was created and applied to the final data to correct any bias in the achieved samples for both students and providers. The student data was weighted to be representative of the student population by gender and year of study (from undergraduate year one to postgraduate study). The weighting efficiency for the student data was 75% and the largest weight factor applied to an individual response was 3. The teaching staff data was weighted to be representative of providers by gender, age and level of study. The weighting efficiency for the teaching staff data was 72% and the largest weight factor applied to an individual response was 2.
12. Respondents were asked about their experiences of and attitudes towards digital teaching and learning in higher education.
13. For the student survey, 804 respondents were undergraduates, and 481 were postgraduates. All students were studying for Level 6 qualifications or above at English higher education providers (including further education colleges offering higher education).
14. For the teaching staff survey, respondents were teaching Level 6 provision or above at English higher education providers (including further education colleges offering higher education).

Annex B: Polling data

Student polling

All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 1,285 students. Fieldwork was undertaken between 18 November and 2 December 2020. The survey was carried out online. The figures have been weighted to make the sample more representative of English students.

Some questions asked relate to how the pandemic has changed attitudes to digital teaching and learning. For these questions, we have excluded some responses from students who are likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online, from the results shown. In these cases, the excluded responses were on average more positive than the results shared, which we assume is a product of wanting to embark on a distance learning course in the first place. Where questions relate to overall attitudes towards digital teaching and learning, we have included these responses. We have specified our approach below for all questions.

Table 10: Student polling – questions with all respondents

In the past two weeks, please choose a statement that most accurately reflects the type of teaching and learning you have received	
Unweighted base	1285
Fully online delivery of teaching and learning; no in person delivery	61%
Mostly online delivery, with in person teaching and learning once or twice per week	31%
Mostly in person delivery with online teaching and learning once or twice per week	5%
Fully in person delivery of teaching and learning; no online delivery	3%
Since the start of this academic year (2020/21), where have you been living?	
Unweighted base	1285
Accommodation provided by the university	13%
Halls of residency provided by a private company	7%
At your parents or guardians' home	19%

Your own property (own outright or with a mortgage)	14%
Rented from a private landlord	40%
Rented from a local authority or housing association	6%
Other	2%

While digitally learning this academic year, have you been without access to any of the following? (Please select all that apply)

Unweighted base	1245
The right technology hardware (e.g. a computer, tablet, smartphone, etc.)	15%
The right software/applications (e.g. access to Microsoft office, Zoom, etc.)	12%
Good enough internet access	30%
Technical support if anything breaks/goes wrong	24%
A qualified teacher or instructor for your studies	10%
An adequate study space (e.g. space for a desk, a chair, quiet environment, etc.)	30%
None of these	45%

How confident or not are you that you have the digital skills necessary to successfully engage with the digital teaching and learning you are receiving?

Unweighted base	1245
Very confident	49%
Somewhat confident	42%
Somewhat unconfident	7%
Not at all confident	3%

Net: Confident	91%
Net: Not confident	9%
To what extent do you agree or disagree with the following statement: I am content with the digital teaching and learning I have received on my course.	
Unweighted base	1245
Strongly agree	22%
Tend to agree	44%
Tend to disagree	19%
Strongly disagree	9%
Not sure	5%
Net: Agree	67%
Net: Disagree	29%
Which, if any, of the following aspects of your university learning do you feel cannot be replicated online and are best delivered face to face? (Please select all that apply)	
Unweighted base	1245
Lectures	24%
Seminars for your subjects	37%
One to ones with your advisor	30%
Social interaction with other students	67%
Social interaction with academic staff	53%
Collaborative/group working among students	51%

Labs (i.e. practical work that would previously have been done in a laboratory setting)	53%
Placements (i.e. experience within an external organisation or company)	52%
Performances and portfolio reviews	24%
Other	2%
Nothing - I do not think any aspects of my course cannot be replicated online	7%
Not sure	6%
Have you been asked for feedback on the digital teaching and learning you have received since the beginning of this academic year (2020/2021)?	
Unweighted base	1245
Yes	52%
No	48%
Thinking about your assessment and exams once the COVID-19 pandemic is over, how would you prefer your assessment or exams for your course to be delivered?	
Unweighted base	1285
Online/remotely	32%
In person/campus based	28%
A combination of digital/remote delivery and in person/campus based	28%
Not sure	11%

Table 11: Student polling - questions which exclude students who were likely to be on a course specified as distance learning from the outset, rather than a predominantly in-person course that moved online

Which statement, if any, best applies to your experience of digital learning before the outbreak of COVID-19 (Before March 2020)?	
Unweighted base	1173
I had no experience of digital teaching and learning	63%
I had experienced digital teaching and learning at least once or twice per year	21%
I had experienced digital teaching at least once or twice per month	8%
I had experienced digital teaching and learning at least once or twice per week	8%
Which, if any, of the following types of digital teaching and learning have you been receiving since the start of this academic year? (Please select all that apply)	
Unweighted base	1134
Live online lectures	58%
Recorded online lectures	73%
Uploaded lecture slides	68%
Video seminars (e.g. Teams, Zoom, etc.)	80%
Labs (i.e. practical work that would previously have been done in a laboratory setting)	12%
Placements (i.e. experience within an external organisation or company)	6%
Performances and portfolio reviews	8%
Other	6%
Not sure	2%

Please choose a statement that most accurately reflects your experience:

Unweighted base	1134
The digital teaching and learning I have received is in line with or better than what my provider told me I would get	56%
The digital teaching and learning I have received is worse than what my provider told me I would get	32%
I was not told by my provider that I would receive any digital teaching and learning	12%

Which, if any, aspects of your course should your university continue delivering online once the COVID-19 pandemic is over? (Please select all that apply)

Unweighted base	1134
Lectures (delivered live over video conferencing software, e.g. Zoom or Microsoft Teams)	25%
Lectures (uploaded recordings)	45%
Seminars for your subjects	19%
One to ones with your advisor	26%
Social interaction with other students	11%
Social interaction with academic staff	13%
Collaborative/group working among students	14%
Labs (i.e. practical work that would previously have been done in a laboratory setting)	5%
Placements (i.e. experience within an external organisation or company)	5%
Performances and portfolio reviews	9%
Other	2%
Nothing - I do not think any aspects of my course should be delivered online after the pandemic	29%

Not sure	8%
How motivated to study have you felt when learning online compared to learning face to face?	
Unweighted base	1134
A lot more motivated	4%
Slightly more motivated	9%
The same as when learning face to face	20%
Slightly less motivated	35%
A lot less motivated	32%
Net: More motivated	13%
Net: Less motivated	67%

Teaching staff polling

All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 567 academic staff. Fieldwork was undertaken between 18 November and 3 December 2020. The survey was carried out online. The figures have been weighted to make the sample more representative of academic staff teaching level 6 and 7 in England.

Table 12: Teaching staff polling

In the past two weeks, please choose a statement that most accurately reflects the type of teaching you have done:	
Unweighted base	567
Fully online delivery of teaching; no in person delivery	59%
Mostly online delivery, with in person teaching once or twice per week	24%
Mostly in person delivery with online teaching once or twice per week	13%

Fully in person delivery of teaching; no online delivery	5%
Which, if any, of the following types of digital teaching and learning have you done since the start of this academic year? (Please select all that apply)	
Unweighted base	536
Live online lectures	51%
Recorded online lectures	60%
Uploaded lecture slides	61%
Video seminars (e.g. Teams, Zoom, etc.)	80%
Labs (i.e. practical work that would previously have been done in a laboratory setting)	12%
Other	15%
Not sure	1%
Which statement, if any, best applies to your experience of digital learning and teaching before the outbreak of COVID-19 (before March 2020)?	
Unweighted base	567
I had no experience of digital teaching and learning	47%
I had experience of digital teaching at least once or twice per year	30%
I had experience of digital teaching at least once or twice per month	10%
I had experience of digital teaching at least once or twice per week	13%
How confident or not are you that you have the knowledge and skills necessary to design and deliver digital teaching and learning?	
Unweighted base	536
Very confident	21%

Fairly confident	59%
Fairly unconfident	15%
Very unconfident	3%
Not sure	2%
Net: Confident	80%
Net: Not confident	18%

To what extent do you agree or disagree with the following statements?

I would like to continue delivering digital teaching and learning for the long term

Unweighted base	536
Strongly agree	18%
Tend to agree	33%
Tend to disagree	26%
Strongly disagree	14%
Not sure	8%
Net: Agree	52%
Net: Disagree	40%

I would like to return to fully face to face teaching and learning as soon as possible

Unweighted base	536
Strongly agree	27%

Tend to agree	28%
Tend to disagree	22%
Strongly disagree	12%
Not sure	10%
Net: Agree	56%
Net: Disagree	34%
Digital teaching and learning provides opportunities to teach students in new and exciting ways	
Unweighted base	536
Strongly agree	24%
Tend to agree	46%
Tend to disagree	18%
Strongly disagree	6%
Not sure	6%
Net: Agree	70%
Net: Disagree	24%
I am concerned about the risks associated with the expansion of digital teaching and learning in higher education	
Unweighted base	536
Strongly agree	17%
Tend to agree	36%

Tend to disagree	25%
Strongly disagree	12%
Not sure	10%
Net: Agree	53%
Net: Disagree	37%
I have felt supported by my institution to deliver digital teaching and learning	
Unweighted base	536
Strongly agree	25%
Tend to agree	41%
Tend to disagree	17%
Strongly disagree	10%
Not sure	6%
Net: Agree	67%
Net: Disagree	27%
I have had access to the resources I need to use digital technology to deliver digital teaching and learning	
Unweighted base	536
Strongly agree	23%
Tend to agree	52%
Tend to disagree	15%

Strongly disagree	6%
Not sure	4%
Net: Agree	75%
Net: Disagree	21%

While delivering digital teaching and learning, have you been without access to any of the following? (Please select all that apply)

Unweighted base	536
The right technology hardware (e.g. a computer, tablet, smartphone, etc.)	23%
The right software/applications (e.g. access to Microsoft office, Zoom, etc.)	20%
Good enough internet access	31%
Technical support if anything breaks/goes wrong	36%
A qualified teacher or instructor for your studies	8%
An adequate study space (e.g. space for a desk, a chair, quiet environment, etc.)	31%
None of these	38%

Which, if any, of the following you would like to continue to deliver online once the COVID-19 pandemic is over? (Please select all that apply)

Unweighted base	536
Lectures (delivered live over video conferencing software, e.g. Zoom or Microsoft Teams)	34%
Lectures (uploaded recordings)	41%
Seminars	29%
One to ones with your students	51%

Engagement with students	37%
Engagement with colleagues	45%
Collaborative/group working among students	30%
Labs (i.e. practical work that would previously have been done in a laboratory setting)	6%
Performances and portfolio reviews	19%
Other	5%
Nothing - I do not think any aspects of my teaching should be delivered online after the pandemic	16%
Not sure	5%

And which, if any, of the following do you feel cannot be replicated online and are best delivered face to face? (Please select all the apply)

Unweighted base	536
Lectures	21%
Seminars	35%
One to ones with your students	26%
Engagement with students	45%
Engagement with colleagues	34%
Collaborative/group working among students	44%
Labs (i.e. practical work that would previously have been done in a laboratory setting)	42%
Performances and portfolio reviews	21%
Other	5%

Nothing - I do not think any aspects of my teaching cannot be replicated online	11%
Not sure	5%

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Abbreviations

AI - Artificial intelligence

AR - Augmented reality

CPD - Continuous professional development

OfS - Office for Students

QAA - Quality Assurance Agency

RNCM - Royal Northern College of Music

UNESCO - United Nations Educational, Scientific and Cultural Organisation

VR - Virtual reality

Notes

¹ For further information, see:

https://www.nasa.gov/mission_pages/newhorizons/overview/index.html

² See https://www.officeforstudents.org.uk/media/a7ae78cb-893f-459f-9f94-a9505e9c5506/january_letter_from_minister.pdf

³ See <https://www.ippr.org/publications/an-avalanche-is-coming-higher-education-and-the-revolution-ahead>

⁴ Full results of the polling are available in Annex B. All further references to polling conducted for this review are to this.

⁵ The Office for Students, 2020, ‘Digital poverty’ risks leaving students behind’, available at: <https://www.officeforstudents.org.uk/news-blog-and-events/press-and-media/digital-poverty-risks-leaving-students-behind/>

⁶ See: Office for Students, 2020, ‘What students are telling us during lockdown’, available at: <https://www.officeforstudents.org.uk/news-blog-and-events/blog/what-students-are-telling-us-about-learning-during-lockdown/>; and Times Higher Education, 2021, Digital Teaching Survey. Available at: <https://www.timeshighereducation.com/features/times-higher-educations-digital-teaching-survey-results>

⁷ Times Higher Education, 2020, ‘THE leaders survey: will Covid-19 leave universities in intensive care?’ Available at <https://www.timeshighereducation.com/features/leaders-survey-will-covid-19-leave-universities-intensive-care>.

⁸ Veletsianos G, 2020, ‘Learning online, the student experience’, John Hopkins University Press; Education Endowment Foundation, 2020, ‘Remote learning, rapid evidence assessment. Available at <https://educationendowmentfoundation.org.uk/covid-19-resources/best-evidence-on-supporting-students-to-learn-remotely/>; Means B, Toyama Y, Murphy R, Bakia M, Jones K, 2009, ‘Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies’, U.S. Department of Education. Available at <https://eric.ed.gov/?id=ED505824>; Arizona State University Foundation and The Boston Consulting Group, 2018, ‘Making digital learning work: success strategies from six leading universities and community colleges. Available at <https://edplus.asu.edu/sites/default/files/BCG-Making-Digital-Learning-Work-Apr-2018.pdf> (PDF).

⁹ Education Endowment Foundation, 2021, ‘Best evidence on impact of school closure in the attainment gap. Available at <https://educationendowmentfoundation.org.uk/covid-19-resources/best-evidence-on-impact-of-school-closures-on-the-attainment-gap/>

¹⁰ For further information, see <https://solarsystem.nasa.gov/basics/primer/>

¹¹ Full definitions are given in table 1.

¹² As explained in the introduction, these recommendations are not regulatory advice or guidance.

¹³ Our approach to defining these terms has been informed by the Quality Assurance Agency for Higher Education's 'Taxonomy for digital learning', available at <https://www.qaa.ac.uk/docs/qaa/guidance/building-a-taxonomy-for-digital-learning.pdf> (PDF)

¹⁴ QAA, 2020, 'Building a taxonomy for digital learning', available at <https://www.qaa.ac.uk/docs/qaa/guidance/building-a-taxonomy-for-digital-learning.pdf> (PDF)

¹⁵ Laurillard D, 2015, 'Thinking about blended learning. A paper for the thinkers in residence programme', available at <https://discovery.ucl.ac.uk/id/eprint/1549749/>

¹⁶ See page 11 of QAA, 2020, 'Building a taxonomy for digital learning'.

¹⁷ See page 16 of QAA, 2020, 'Building a taxonomy for digital learning'.

¹⁸ Note: This term is not used in this report, but is often used in literature on the subject of digital teaching and learning.

¹⁹ For example, see MIT Professional Education at <https://professional.mit.edu/>

²⁰ Patru, M, Khvilon, E, 2002, 'Open and distance learning: trends, policy and strategy considerations', UNESCO. Available at <https://unesdoc.unesco.org/ark:/48223/pf0000128463>

²¹ QAA, 2020, 'Building a taxonomy for digital learning'; Economist Intelligence Unit, 2008, 'The future of higher education: How technology will shape learning', available at <https://files.eric.ed.gov/fulltext/ED505103.pdf> (PDF); Scanlon, E, and others, 2013, 'Beyond prototypes: Enabling innovation in technology-enhanced learning', available at <http://oro.open.ac.uk/41119/>

²² Further education learning technology action group, 2013, 'Paths forward to a digital future for further education and skills', available at <http://feltag.org.uk/>

²³ World Economic Forum, 2020, 'Schools of the future: defining new models of education for the fourth industrial revolution'. Available at: <https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution>

²⁴ Godonoga, A, Martin, M, 2020, 'SDG 4: Policies for flexible learning pathways in higher education – Taking stock of good practices internationally', UNESCO, available at www.iiep.unesco.org/en/publication/sdg-4-policies-flexible-learning-pathways-higher-education-taking-stock-good-practices

²⁵ Universities UK, 2020, 'Majority of adult learners would upskill at university if given the chance', available at <https://www.universitiesuk.ac.uk/news/Pages/Majority-of-adult-learners-would-upskill-at-university-if-given-the-chance.aspx>. Savanta ComRes

interviewed 1,591 English adults aged 18 to 60 interested in future university study online between 28 August and 15 September 2020.

²⁶ See <https://www.getsmarter.com/>

²⁷ Jisc, 2020, 'Learning and teaching reimagined: a new dawn for higher education?', available at <https://www.jisc.ac.uk/reports/learning-and-teaching-reimagined-a-new-dawn-for-higher-education>.

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