

Digitally enabled teaching & learning at Cambridge during the disrupted period: lessons learnt and priorities for supporting the enhancement of residential education in the recovery period

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Aims

Between March and July 2021, the Cambridge Centre for Teaching and Learning (CCTL), in collaboration with staff of the Faculty of Education, conducted a short, focused research project. The scope of this research is what might be described as the ‘disrupted period’ (March 2020-July 2021) and aims to inform enhancement activities as we enter a period of transition towards fuller and longer-term recovery. Thus, while substantive, ‘bigger picture’ questions concerning longer-term strategy and resourcing are well beyond the scope of this project, nevertheless our findings will make a valuable contribution to enhancing education within the short to medium term and we hope that they will also form part of the foundation for the necessary medium to long-term endeavour to develop a digital education strategy.

The project included three strands:

- *Strand 1:* A rapid evidence review, synthesising existing evidence and literature on digitally enabled teaching and learning in Cambridge and a sample of other research-rich, residential higher education institutions (appended)
- *Strand 2:* Understanding Cambridge practices and cultures around teaching and learning in person and online, from the beginning of the disrupted period (March 2020) onwards.

- *Strand 3*: Understanding the patterns of institutional support and training put in place for teaching staff and students, from the beginning of the disrupted period (March 2020) onwards.

Brief Account of Methods, Data collection & Analysis

Strand 1

Strand 1 consisted of a rapid evidence review undertaken in March and April 2021, which developed a more coherent overview of what is currently a fragmented evidence base within Cambridge. Specifically, it identified priorities for further research during the Easter Term 2021 into the experiences of Cambridge students and staff and the outcomes of support and training for staff in adapting to and improving online teaching and learning during the disrupted period.

Strands 2 & 3

Strands 2 and 3 were addressed through interviewing a range of individuals about their experiences of digital teaching and learning at Cambridge throughout the disrupted period. Work on Strands 2 & 3 was informed by the findings of the Rapid Review.

Those interviewed fit broadly into three categories: **Students** (including both undergraduates and postgraduates, but focused mostly on undergraduates), **Teaching Staff** (lecturers/supervisors) and **Working Group Staff** tasked with supporting the pedagogical or technical aspects of online teaching and learning, including but not limited to, members of the Teaching, Learning & Assessment 2021 Working Group, University Information Services (UIS), Cambridge University Libraries, the Disability Resource Centre (DRC) and the Technology Enabled Learning Service (TEL).

In total, 9 students in a range of subjects were interviewed (7 undergraduate and 2 postgraduate). 10 members of the teaching staff took part in the project, with half teaching within the sciences, and half in arts, humanities and social sciences. 8 people from the Working Group were interviewed, including representatives from all of the groups mentioned above.

Interview Methodology and Questioning

Due to continuing restrictions to meeting in person, interviews took place online via Zoom in May, June and July 2021 and were recorded and transcribed to enable ease of review. Interviews were

scheduled individually or in groups of up to three depending on the availability of participants. Individual interviews lasted between 30-45 minutes, while group interviews were 45 min-1 hour to allow for the increased number of participants to express their views. Each interview was led by a research assistant, and featured questioning revolving around the participants' experiences of and attitudes towards:

- digital teaching and learning in principle and practice
- the opportunities and challenges experienced this year through digital teaching and learning
- the support required and made available to them
- the impact on workload
- their vision of how digital teaching and learning can and should be integrated into practice going forwards.

Interview data were analysed using thematic analysis, informed by the findings of the Rapid Review, to establish trends in the views given, and identify areas of interest from the responses.

Brief Overview of Findings

From the interviews conducted, some key themes on the challenges and opportunities of the 2020-2021 digital teaching and learning experience for Cambridge students, teaching staff, and support staff were identified. The most significant challenges and opportunities are highlighted below.

Challenges

Challenges identified by students

- Perceptions of varying **quality** of online provision depending on the department/individuals concerned
- A significant number of students interviewed reported feeling more **isolated and less engaged** in their studies when teaching and learning was online than in previous years
- An **increase in workload** for the 2020-2021 academic year, ranging from the increased time required to watch (and sometimes re-watch) pre-recorded lectures, to the difficulty of participating in online practicals for students enrolled in the sciences.
- The majority of respondents cited the **decentralisation of resources** and the **lack of consistency in content delivery**, as a major obstacle to their learning experience this past year
- Loss of **social engagement** within the learning process, such as the difficulty in building cohort relationships and connections with teaching staff
- Anxieties surrounding the quality and fairness of **assessment**

Challenges identified by teaching & support staff

- An **increased workload**, with most teaching staff citing course and teaching redesign and setup as major contributors to the increased workload. At the time of interviews, many noted that these issues had now been largely overcome. Other factors included:
 - An overall **increase in student numbers** (particularly for supervisors)
 - The **diverse non-work pressures** unique to the pandemic (particularly childcare)
 - The emphasis on providing a **quality experience** and how that need taps into high levels of **personal perfectionism** for many teaching staff at Cambridge
- The impact of the impossibility of some forms of practical teaching on students' learning
- **An initial lack of technical knowledge and skills**, which staff commented had been largely overcome after over a year of digital teaching

Opportunities

Opportunities identified by students

- **Increased flexibility in the learning process**, particularly regarding lectures, but also the increased presence of other online materials, which allowed students to access their learning in ways and times that are most suitable for them.
- **Greater accessibility and less anxiety about missing course content**, particularly for those with medical conditions, certain disabilities, or other circumstances that may make attending lectures/classes at specific times difficult

Opportunities identified by teaching and support staff

- **Flipped learning** (where materials are provided ahead of lectures/classes to introduce new concepts that are expanded upon and used in contact teaching time) provides new pedagogical opportunities that can enhance the quality of teaching and learning
- **Online supervisions** were felt to offer convenience, particularly in terms of timing or for those with limited access to physical teaching spaces
- **Online marking** (both for examinations and supervision/class work) can decrease workload for academic staff as work is easier to read and does not need to be picked up from specific points
- **Online marking** can also be more easily returned to students in advance of supervisions, meaning that students are able to **reflect on feedback** before engaging in supervision activities.

Beyond the identified themes from participants regarding key challenges and opportunities from this past academic year, and consistent with the exploration of strands 2 and 3 outlined above, further analysis of the interviews and focus groups identified important and consistent themes in association with

- Cambridge's digital teaching and learning practices and cultures (including the role of pre-pandemic perceptions), and
- patterns of support (including the influence of prior digital teaching and learning experience) that will be discussed in detail in the following section.

Understanding Cambridge's Digital Teaching and Learning Practices and Cultures: A Closer Look

Supervisions

Of the range of students interviewed, a few (mostly in the sciences) had both in-person and online supervisions this past academic year, but the majority of respondents participated only in online supervisions, despite residing in Cambridge during the Michaelmas 2020 and Easter 2021 terms. Whether they had a hybrid or fully online supervision model did not seem to influence responses about their experience in supervisions this year, as **all student respondents expressed an interest in returning to in-person supervisions next year (or whenever possible)**. Teaching staff also had a desire to return to in-person supervisions, although less overwhelmingly so than students, with some saying that online supervisions were more time effective and easier to organise, especially if the supervisor did not have access to his/her own office space. Additionally, some digital teaching and learning tools, such as the possibility to screen-share, were identified as having the possibility to enhance supervision activities, depending on the subject/topic.

Group Supervisions

Although in-person supervisions were favoured over online supervisions, the preference was more highly pronounced when it came to group (in contrast to one-on-one) supervisions. The reasons students provided for why they heavily favoured in-person supervisions over online group supervisions (with two or more student participants) included **internet connectivity issues** and **difficulty reading facial features and cues**, specifically how both of these issues created an **inability to fully engage with others**. One second year student studying English said

"Group supervisions are quite hard to do online because there's always someone with background noise or someone [whose] wifi lags. They start making a really good point and disappear."

Teaching staff also commented on poor internet connectivity and inability to pick up on social cues (particularly when mid-way through the year many students began turning off their cameras), and how both negatively impacted the teaching process. Both students and supervisors commented on the **awkwardness of including supplemental materials and resources** within an online supervision, specifically white boards, diagrams, books, and jam boards, all of which were particularly emphasised by those within the sciences.

Of all the different supervision formats experienced by students who participated in interviews, the least preferred supervision model was a **hybrid-model group supervision**, in which the majority of participants met in person while only one or two were online. Students participating in interviews commented on difficulties where online supervisees were unable to fully engage in the in-person discussion and said that their experience of hybrid-model group supervisions was that they were neither accessible or useful:

"[It was] the most useless supervision I've ever been on in my life. I couldn't hear what was happening, I couldn't see the board, and so I must confess I just watched Netflix because I was not getting anything from it" (2nd year Medical student)

One-on-one Supervisions

One-on-one online supervisions were more positively received than group online supervisions by students participating in these interviews. While issues reading body language and non-verbal cues still remained, these were felt to be lessened somewhat due to not having to divide attention between participants. Both students and teaching staff did feel there were benefits to the online supervision, particularly the **flexibility it provided in terms of managing time and working spaces**. Students preferred the ease of not having to travel across Cambridge to attend multiple supervisions. Supervisors preferred the **ease of setting up online 'rooms'** vs. the time and effort of booking physical rooms (particularly when they supervised a large number of students), and the ability to easily run supervisions even when not in Cambridge. One further positive aspect of online supervisions (identified by teachers and students) was how the format **encouraged early review and feedback for essay submissions** which left more time for engagement within the supervision itself:

“I think that I have moved into doing more comprehensive written feedback [in advance of the supervision]. And then, using the supervision time in a more open-ended way...[The students] had time to read and digest and then we both were kind of on the same page.” (Teaching staff, Modern & Medieval Languages)

Practicals

Among those participating in these interviews, students and teaching staff within the sciences expressed strong dissatisfaction with their experience of online practicals, specifically commenting on the **“lack of quality teaching”** (in the words of one student, but a sentiment shared by several), **repetition of old practicals** and **general difficulties with replicating lab work online**. Respondents said they had an interest in moving toward in-person practicals as soon as possible. One second-year Veterinary Medicine student expressed their concern about the impact online practicals had on her learning experience:

“I'm scared they're going to do that [online practicals moving forward] because it definitely, especially practicals online, negatively affected my education so much this year.”

The overall preference for in-person practicals does not come as a surprise because, as respondents commented repeatedly, practicals are designed to enhance and engage in hands-on, practical learning experiences (or the ‘doing it yourself bit’ as one student put it). However, as restrictions arising from the pandemic recede, there could be further reflection on the significance attached to what students identified as the social engagement aspect of practicals: students commented that they valued practicals both for the hands-on nature of the work and also for the opportunities provided by practicals to develop team working skills and academic motivation:

“I also think there’s a social aspect to practicals. So one of the main ways I meet people doing my subject from other colleges are before and after lectures and during practicals” (2nd year Natural Sciences student)

Teachers agreed about the importance of social engagement within practicals. One teacher in the sciences said they would not mind if lectures were to remain online in future, because they had the opportunity to engage socially with their students in the practicals.

However, the experience of online practicals as described in interviews included positive elements. Both students and teaching staff highlighted certain aspects that were done well, such as the **use of breakout rooms** to try and replicate small lab groups, **overall student engagement** (in terms of a more diverse range of students answering questions than would typically happen in an in-person setting), and **the use of effective practical replacement tasks** (although it was highlighted that while some of the replacement tasks were effective in advancing the understanding of theoretical concepts, they were not successful replacements for in-person lab work overall):

“We sent out some equipment to... mock up a real practical, and sent out kits to supervisors... We will retain them. I feel that, for some students, they probably learned more than they do in the classroom because of how they engage or how they interact... so I think going forward, we certainly won't be looking to replace hands-on practicals, but I think we'll have a kind of blended combination of both.” (Teaching staff, Natural Sciences)

Despite discovering positive aspects of online practicals, once member of teaching staff in this sciences considered that this year's exams reflected the overall difficulties with moving practicals online, with students' responses in assessments showing a lack of understanding for key concepts and content. This member of staff considered that there was a clear need to return to in-person practicals, which might be enhanced through some elements of the online experience which had been shown to be educationally valuable:

“There's nothing that can replace physically using lab equipment. Literally nothing. And I think, I think I'm allowed to say this, and it was obvious in exam marking as well, people struggled answering questions that relied on knowledge of 'I've done this myself'.... A real obvious lack of the context the questions were based in.” (Teaching staff, Natural Sciences)

“We also had some practical replacement tasks that were not the same thing as what the practical would have been, and while they were useful it's still, I still think the things that we missed out on, like there was certain experiments that we weren't able to do, I think my understanding of those particular topics would have been possibly better if I'd got to actually do the experiment itself rather than just doing the theoretical side of it.” (2nd year Natural Sciences student)

Social Engagement in the Teaching and Learning Process

A commonality among all respondents for the return to both in-person practicals *and* in-person supervisions was the **social engagement** both provided in the teaching and learning process, not just the **isolation** that was associated with online learning (which was a theme expressed by all students) but the impact of other students and teachers in their own learning process, specifically the **increased engagement and motivation that comes with teaching and learning collaboratively.**

“I'd say it's easier to knuckle down and get to work [online], but it's been harder to be inspired and really motivated” (2nd year English student)

“The social part of learning is very important. It partially motivates you to go to classes in the first place and makes the learning experience much more enjoyable. I think one problem that I realised with not having enough friends in my course is that I couldn't form study groups because I just don't know people well enough. If I had questions it's awkward to ask my classmates because I barely knew them so there was very little collaboration and I had to do everything by myself.” (LLM postgraduate student)

“They have got a lot less hands-on lab experience and they are a lot less socialised than they would have been in a normal year, especially the first years who didn't know anyone coming in and they still don't know too many people very well, just their housemates.” (lecturer, Natural Sciences)

“They never really got the chance to actually know each other as a cohort in the same way that most of the groups do so normally... part of the reason we have classes for our first years is so that they all sit in the same room twice a week and start to know each other rather than just knowing their supervision partners... some of the benefits of the class actually is them standing in the corridor outside gossiping with each other afterwards and all that sort of thing, none of which can really happen [online]. (lecturer, Mathematics)

The emphasis on the lack of collaboration and social engagement in digital teaching and learning is consistent with the Rapid Review findings conducted in strand 1 of this research, which highlighted a common challenge of replicating the social aspects of teaching and learning (including poor communications patterns between teachers and students, as well as overall social engagement with peers) in a digital environment and the questions that presents around quality. But just as there are major challenges around social engagement in an online learning process, equally trends within the

interviews began to emerge around best practices for such engagement including **successful use of breakout rooms**. Students also noted a difference in teachers they perceived to be tech savvy and those who “seemed like they didn’t know how to use the internet,” highlighting an opportunity for future training and support for teaching staff. Students also commented on the improved internet connectivity within the various colleges as the year moved forward, which perhaps would help with social engagement (particularly for group supervisions) in the future.

Lectures

Given the emphasis on the social aspects of teaching and learning, it is not surprising, then, to see that of all the teaching delivery modes – supervisions, practicals and lectures – overall students and teaching staff did not mind online lectures and nearly all respondents preferred online lectures to online supervisions and practicals. **In fact, nearly all of the interviewees responded that they saw some benefit to keeping lectures online moving forward**, particularly the **flexibility** online lectures provide. For students, they had the ability to watch (and rewatch) lectures on their own time, which was seen as a strong academic advantage in learning content. For teaching staff, they had the flexibility to re-record or modify lecture content based on feedback and the needs of the students. However, teaching staff also highlighted the **increased workload** such flexibility required and the significant amount of time spent ‘perfecting’ the lectures which meant they recorded the content several times in order to get a recording they were happy with.

“[In in-person lectures] it'd be quite common for you to make an occasional little verbal slip obviously. In a recorded lecture, those sort of verbal slips don't just pass, they're recorded and can be reviewed by the students so you'll become increasingly conscious that everything you say has to be perfect, precise and accurate and that results in a lot of pressure to try and make sure what you say is perfectly accurate... I think the real difficulty I faced was trying to get comfortable with a quality level that was sufficient to meet the needs of the students' education experience, while not requiring an hour lecture to be recorded and re-recorded 20 times to make sure it was actually flawless.”

(Teaching staff, Natural Sciences)

Further to concerns of ‘perfectionism’ and workload, some teachers raised concerns regarding remuneration for recorded lectures, and the possibility that these could continue to be used once created without staff being properly compensated¹.

Whereas staff expressed some concerns about pre-recorded lectures, the **students expressed a strong preference for shorter pre-recorded lectures** (but were highly critical of *longer* pre-recorded lectures), particularly their ability to enhance discussions, even though some also noted an **increase in workload**, specifically if they were re-watching the lecture content several times. Nearly 100% of students interviewed **favoured pre-recorded lectures over live lectures that had been recorded**, as students felt that with the latter, they were observers rather than active participants in the learning process (citing examples such as inaudible questions from the live audience and gesturing to off-camera items by the lecturer).

One member of support staff interviewed from the University’s Disability Resource Centre emphasised that pre-recorded lectures positively served students with a range of disabilities, largely because of the ease of access and flexibility; they commented, however, that pre-recorded lectures could prove problematic for students with certain hearing and visual impairments.

Interestingly, when respondents shared what they did miss about in-person lectures, answers landed overwhelmingly within the social engagement category such as impromptu meet ups before and after class and during breaks. This finding, then, is consistent with findings on supervisions and practicals about the importance of social engagement in the learning process.

Assessment

Assessment was mentioned repeatedly in all interviews. Regarding assessment, it was clear that Cambridge, prior to the pandemic, had a specific culture around exams, with most students participating in 3-hour in-person examinations in the final weeks of Easter term (of course there was variation across departments). The change to online exams in Easter 2021, like other aspects of the teaching and learning process, was significant, with both advantages and disadvantages highlighted by respondents. Many teaching staff thought online exams provided an **opportunity to re-evaluate the assessment process** and adapted the examination process accordingly, such as modifying

¹ Neither of these eventualities is permitted under the University’s current Policy on Recordings of Teaching Materials / Lectures, and other Teaching, Learning and Assessment Activities (original version approved by the General Board’s Education Committee on 2 October 2020 and updated version approved on 30 June 2021). Accessed at <https://documentcloud.adobe.com/spodintegration/index.html?r=1&locale=en-us> (22 October 2021).

questions, moving to open book examinations, allowing typed scripts, lengthening exam lengths to a time range, and/or testing analytical skills over knowledge and memory retention.

“I usually feel ... I spent two terms teaching people to think in interesting ways and then the last term is this pivot to this horrible boot camp about writing in an hour. It's not intellectually consistent with what we say we're trying to do...” (lecturer, English).

Others kept questions consistent with previous years, with closed book examinations (either with or without online proctoring), retained handwritten exams which were scanned by the student and sent electronically, and/or kept to tight examination timelines.

Teaching staff that utilised typed examinations preferred the ease that came with digital exam submissions and marking (similar to the views expressed regarding supervision assignments) and it proved easier for staff to mark scripts, although some students mentioned difficulties with the submission process, both for electronic and handwritten scripts.

Overall, some students discussed a significant **increase in workload** with online exams. Although they were told to sit the exam as if they had only three hours, many said that they tried to use the full time period (e.g. 24 hours), as they felt that by not doing so they risked falling behind their peers and/or underperforming in the examinations:

“Most people were trying to stay up the entire time, not because they actually wanted to, but because they thought stronger candidates would, which would make it harder to do well in the paper... we were staying up 48 hours just to do exams, which I think health wise is a really big concern”. (2nd year English student).

Students also expressed a great deal of anxiety around cheating, many of them citing stories that they had heard about people bending or breaking examination protocols. Whether or not these stories are actually true, this built further anxiety among students, with some reporting giving up on the prospect of receiving a First and others feeling like their grades were invalidated by the perceived unfairness of being unwilling or unable to take actions they perceived as cheating:

“The fact that you could just collude and no one will ever know, apart from you signing a thing of ‘this is all my own work’... there's nothing they can really do about that and so it's almost like your

grades are based on your morals. So the fact that I could get a 2:1, not because I was 2:1 level but because loads of people collaborated so that they got a First, or they've got their friends that are experts in the subject to help them, is a little bit disappointing.” (1st year Economics student)

Maintaining honesty and integrity during exams is also an issue with in-person exams. Students participating in these interviews expressed concerns at what they saw as the increased ease of dishonest behaviour in a digital format.

Expectations of a Cambridge Teaching and Learning Experience and Impact on the Perception of the Role of Digital Teaching and Learning

The overall analysis of Cambridge’s digital practices and culture during the disrupted period revealed larger insights on the **perceptions** and **expectations** of

- what a learning experience at Cambridge *should be* and
- who a digital teaching and learning experience best serves (or does *not* serve).

In line with findings from the Rapid Review which highlighted how heavily experience influences perception, Working Group staff concerned with digital teaching and learning strategy reported that the perceptions of individuals regarding the place of digital teaching and learning at Cambridge and their experiences this year have had significant effects on the ways in which they engaged with digital teaching and learning.

“You know the technology barrier is removed. No academic in Cambridge who's been here over the last 15 months is able to say, ‘I'll never teach online’ because they've all had to do it in some way, shape or form, and for many of them that's been a positive experience and they've realized that actually this thing isn't as scary as I thought it was, and there's... a significant group of academics... who will continue to use those even if things do go back to the way they always work. What concerns me is that I think there's an equally significant group of academics who've had a suboptimal experience... If they've had a negative experience they'll think that those views that they held about online learning are even more entrenched, that they'll think ‘well, I never want to have to teach like this again’.” (Working Group Staff)

Understanding the Cambridge Experience

It was noted that in order for digital teaching and learning to become more widely accepted as a means of enhancing teaching and learning at Cambridge, a clear understanding is required as to

what exactly constitute distinctive aspects of Cambridge learning experiences. Staff and students generally highlighted the residential experience and supervision teaching, but beyond this, there were considerable variations in perceptions.

“Now, defining a Cambridge learning experience is problematic because that means different things to different people, but there are some...fundamental things that we can say about Cambridge. You know we're heavily reliant on small group teaching, we're heavily reliant on in-person teaching, actually. It's fundamentally a residential... experience. But I don't necessarily subscribe to the view that that means that you can't create an authentically Cambridge learning experience in the online setting. I think that can be done, but I think it needs to be done with purpose and it needs to be done with input from people who are immersed in that as academics who've been here for long enough to know what that feels like.” (Working Group Staff)

Highlighting what the above respondent referred to as ‘fundamental’ to a Cambridge teaching and learning experience, interviewees, students in particular (but also some staff), revealed a clear pattern of linking the in-person elements of teaching and learning to a quality Cambridge learning experience. For example, when comparing their 2020-2021 supervisions to those of last year, one student said:

“If I was being supervised [last year] on something special and another college expert would come and do it, then I'd go on a walk with them and it'd be 2 hours long and it'd be insightful. But you can't really go on a walk anymore.” (2nd year English student)

For this student there was a clear connection between **physical space and quality of the learning experience**, as they linked an “insightful” supervision with the physical space and connection of walking together. They end their statement by saying “but you can't really go on a walk anymore” implying that therefore they can no longer have insightful conversations. Several students shared similar sentiments about the lack of meaningful conversation (typically blaming internet connectivity or general ‘zoom awkwardness’) and how it directly impacted the quality of their Cambridge learning experience.

“If you got on to a really interesting topic it's just closed off straight way toward the end and you never really go back to it.” (2nd year Natural Sciences student)

“You didn’t have the same quality of teaching” (2nd year Veterinary Medicine student)

“I think I'd be far more passionate about... having supervisions in person than lectures because I think it's the one thing, or a main thing, that differentiates somewhere like Cambridge from other universities and so I would prefer to have that in person.” (1st year Economics student)

Understanding Pre-Pandemic Perceptions

In reflecting on larger perceptions about what a Cambridge experience is or should be, respondents also revealed pre-pandemic attitudes about **who a digital teaching and learning experience best serves** (with many identifying, or at least heavily implying, that it was *not* them). For example, the first year economics student quoted above also had strong perceptions about the role of digital teaching and learning prior to the pandemic saying,

“I don’t think I was opposed to it, but I think, especially at somewhere like university, it does make you think, well what are you paying for if it’s all online?”

The second year English student who linked insightful supervisions to the ability to walk together did not express the same strong attitudes as the first-year Economics student about the role of digital teaching and learning prior to the pandemic; rather they expressed indifference, which was a common theme throughout the interviews, particularly with students. For example, one second year Vet Med student said:

“I hadn’t given it [digital teaching and learning] much thought... All my teaching was in person and I never really thought it wouldn’t be.”

Another second year natural sciences student said simply:

"online learning feels less real so I don't quite commit to it as much as I think I should."

The overall belief articulated by students participating in these interviews that online learning was not ‘for students like them’ resonates with findings from the Rapid Review, which outlined the strong perception that existed within the UK higher education sector about *who* a digital teaching and learning experience best serves: within the UK, there remain strong associations between digital

education and 'non-traditional' pathways, including pathways for students with caring responsibilities or disabilities or students seeking to progress professionally, perhaps combining work and study.

Perceptions & Accessibility

Only two students interviewed – a first year studying Linguistics and a second year Medical student - expressed positive pre-disrupted period perceptions about the role of digital teaching and learning (although many stated they had little or no opinion of them before the disrupted period).

Interestingly, these two students self-identified as students who were not able to benefit from social engagement with others or were unable to take advantage of in-person opportunities.

A representative from Cambridge's DRC spoke to the important role digital teaching and learning plays in creating equitable accessibility to education resources for all student groups, stating that

“we obviously want to return to in-person teaching, but what we don't want to lose is that benefit of the move to online delivery and the advancements we've made in accessibility. The idea of a student with a sensory impairment or long term health condition having to go back to in-person lectures only with no recordings is just something we shouldn't do.”

The second year Medical student identified above agreed, stating, “I actually couldn't think of anything worse than going to an in-person lecture now.”

Perceptions & Expectations

From the interviews, it is clear that existing perceptions and experiences shaped each respondent's expectations about what role digital teaching and learning should have at Cambridge in the future. It was noted that the degree to which teaching staff will be willing to engage with digital teaching and learning will vary based on this year's experience. Some respondents were advocates for increased digital teaching and learning moving forward, while others were more hesitant:

“We need to really understand what is holding those people back, and not just ignore that but actually engage with it directly, because otherwise you will always have a constituency of academics, who are just not bought into what everybody else is trying to do.” (Working Group Staff)

Specifically, from the interviews with the support group it was clear that a strategy for teaching and learning which directly addresses the pedagogical rationale for using digital teaching and learning

elements to support in-person teaching was seen as a priority to develop best practice and embed digital teaching and learning options within the Cambridge system:

“These conversations always need to be led by pedagogy and enabled by technology” (Working Group Staff)

Understanding Cambridge’s Digital Teaching and learning Practices and Cultures: Summary of findings

- There was a perception, particularly among students, that a Cambridge teaching and learning experience was largely a residential one with unique opportunities for engagement in course content, particularly through supervisions and practicals.
- Prior to the disrupted period, most students interviewed had either given little thought or expressed negative attitudes about the role of digital teaching and learning in their own academic journey. Among those interviewed, there was a sense that wholly digital teaching and learning was not for them
- On the whole, attitudes to online group supervisions expressed by staff and students taking part in these interviews were not favourable (with those in the sciences also expressing negative views on online practicals). In particular, respondents cited difficulties with social engagement and poor connectivity
- Some teaching staff identified benefits, such as collaborative editing tools and polling tools which they felt enabled reticent students to engage and so to develop academic confidence
- Despite reporting increases in workload, students and teaching staff indicated a preference for online lectures due to the flexibility and accessibility they provided. Students expressed strong preferences for shorter pre-recorded lectures (but were highly critical of longer pre-recorded lectures).
- Teaching staff and students identified pedagogical benefits of ‘flipping’ lectures, commenting that watching shorter pre-recorded lectures in advance enabled better quality discussions during interactive sessions
- Teaching staff who identified benefits to online lectures also expressed concerns about workload arising from ‘perfectionism’; hourly-paid staff felt that payment did not reflect time commitment
- There were strong views (both positive and negative) about their experience of digital assessment:
 - students and staff reported concern at potential for cheating
 - students also reported putting in excessive amounts of time, in part out of anxiety that others would be advantaged through working for longer

- a number of staff reported improved qualities in students' answers, in particular demonstrating higher-order reasoning.

Understanding Patterns of Institutional Support and Training at Cambridge

Previous Experience in Digital Teaching & Learning

While those with prior experience in digital teaching and learning reported being able to more quickly adapt their processes to the technical and pedagogical demands of online teaching, within this research, they were within the minority, as most students and teaching staff lacked prior experience with digital teaching and learning. A small number of students identified having prior experience in the form of watching a supplemental lecture or with help mastering a skill, such as the use of Microsoft Excel on an online Further Mathematics course. Beyond that, the majority of students interviewed did not have any formal prior experience. Teaching staff identified that their lack of previous digital teaching experience and overall lack of familiarity with digital recording software, resulted in an **increased workload** as they had to learn new processes in order to enable online teaching. This was consistent with the experiences of support staff (in assisting teaching staff through this time):

“I know people have, you know, their workloads have increased because they're trying to achieve that and learn tools and so a positive opportunity is masked by the negative constraints and implications of the pandemic and having to do it all through a very stressful time.” (Working Group Staff)

Most noted, however, that once the necessary skills were in place, they were positive about the opportunities available to them through increased digital resources and support offerings.

The limited experience most respondents had with digital teaching and learning prior to the pandemic is consistent with the findings of the Rapid Review. Conversely, now that baseline technological skills have been developed by a significant proportion of teaching staff, a major barrier to the further adoption of digital teaching and learning has arguably been broken down and may thus serve as a stepping stone moving forward to develop pedagogically focussed support.

Resources and Support

In all interviews and focus groups, participants were asked about the availability and use of university, college, faculty or other resources and support throughout the academic year 2020-2021. Few respondents mentioned their participation in specific resources designed for the disrupted year, such as those offered by the Centre for Teaching and Learning (although one member of teaching staff and one member of the support group *did* utilise such resources and reported that they were beneficial to them). Beyond these two respondents, the most common resources utilized this past year were at the college or department level. They include **reimbursements for special equipment** such as a dissection app purchased by a medical student, **digital library resources**, and **film editing training and software**. Further to the college and department academic resources, a representative from the Disability Resource Centre said that in 2020-2021 they saw a 50% increase from the previous year in the number of **students reaching out for non-medical health support**.

Decentralization and Disconnectivity

From responses, it became evident that the 2020-2021 digital teaching and learning experience for students, teaching and support staff was significantly shaped by their faculty, college and subject affiliations. This is not dissimilar from a more traditional, in-person teaching and learning experience at an institution like Cambridge, which is highly decentralized with high levels of support and resources coming from the colleges, faculties and specific subjects. And while there was significant understanding of Cambridge as a decentralized university and an acknowledgement, therefore, that experiences would vary significantly based on this fact, as interviews continued, it became increasingly evident that the inconsistency in resources and support led to increased levels of difficulty in accessing *and* engaging in the digital teaching and learning experience. **Thus, the decentralization of the university seemed to be increased through the digital experience.**

"I wish there was an easier way to zoom out of the online course... there's this huge ecosystem of things just floating around. They're all resources but there's no way to actually thread through them, especially online. Whereas even in [normal] term time, the fact that they happen once a week and you go to them ... gives you a sense of structure." (2nd year English student)

The majority of students and staff interviewed mentioned some level of frustration at the disconnectivity and decentralization of resources, ranging from **difficulty organising and accessing resources** to **overall inconsistencies in content delivery**:

"English is hugely decentralised so we get reading lists on the faculty website, lectures on Panopto, lecture guides separately in an email which we have to trace the email back to... And we get our actual lecture handouts on Moodle. There are 5 different places where you can find something."

(2nd year English student)

"On the topic of uploading lectures, Linguistics had a lot of issues with that where some of our lecturers like to upload their lectures in different ways. So you have the groups who did them on Panopto. The group who uploaded Zoom recordings. The groups who (one person actually) who for some reason uploaded all lectures on a Google Drive folder. One lecturer only uploaded mp3 files.

The lack of consistency is a bit of a problem." (1st year Linguistics student)

"It was very difficult to know what was going to be the best option and a lot of the time I was getting like 'here are eight different ways', and I was like, I don't really have the time to review eight different ways I'd like you to review them and tell me the one best one and I'll learn that." (Teaching staff, Natural Sciences)

Requests for support from UIS and departmental specialists were numerous, and complicated by the lack of consistency between departments and some individuals as to the software and platforms used for the creation and sharing of digital content. (Of note, most respondents commented that when they emailed the appointed resource officer directly, they *did* receive helpful and prompt replies). Staff involved with supporting digital teaching and learning noted that Cambridge has historically been fragmented and inconsistent in the quality and amount of support available from departments, and central IT support is significantly less well resourced than at institutions of comparable size:

"So a lot of the time it's analyzing what they're (teaching staff) trying to do and helping them with it, or it's saying no... we don't have enough resources to implement it, we don't have enough resources...and sometimes you know they have a question they go, 'can we do this' and 'can we go out of the box'. We could configure it to do it, but we don't have enough resources to do it."

(Working Group Staff)

While solutions were found in order to enable functional teaching, the systems that are in place remain fragile, and much greater investment and support is required to ensure that digital teaching and learning is sustainable.

“We're seeing the consequences of seven years of underinvestment in our systems and our tools in our training in our staff upskilling in the way that we have prioritised education. Yes, this university is a residential university. It's a world leading world expert in residential teaching, but you can enhance residential teaching with digital education and there's often been a reluctance within the university to invest in that, and then, when we have invested in that it's never been done centrally and so now we're getting to a point where we're relying even more on central tools that have been underinvested in and that is really, really, really bad.” (Working Group Staff)

While the libraries were able to access financial support to increase the amount of digital resources available, there were complications involving limitations in the licenses for digital books, the accessibility of electronic legal deposit resources and books unavailable in digital formats. Issues for students and teaching staff also arose because there was no single platform for accessing ebooks and journals, as the publishers and rights-holders utilise a wide range of proprietary access portals:

“We do have aggregators, we try and get them from aggregators so it's the same experience, but there is just a big difference between what that provision looks like: whether you can download a chapter, whether you can't download a chapter, whether you download the whole book or then you lose it two days later, whether you can make notes, whether you can't make notes. How you store that information - do you need to make your own account on each platform. It proliferates with a number of platforms, the number of types of ebooks that you have.” (Working Group Staff)

Understanding patterns of institutional support and training at Cambridge: summary of findings

- The majority of students and teaching staff interviewed had little to no prior experience in digital teaching and learning
- Cambridge is highly decentralized, and thus each respondent's digital teaching and learning experience was largely shaped by their faculties, departments and colleges
- The disconnectivity of Cambridge resource and support offerings was accentuated by the digital teaching and learning experience in 2020-2021

- Respondents appreciated efforts by colleges and departments to improve internet connectivity, reimburse for necessary equipment or resources and make digital content available
- the lack of consistency in how such support was delivered was a high point of frustration

The decentralization of Cambridge and its impact on the digital teaching and learning experience presents an opportunity for the university moving forward, specifically to identify the most successful practices and make them available to all departments/colleges moving forward. This would address concerns from teaching staff about the expressed need for information available and inability to decipher best practices, etc., and concerns from students about the frustrations on the disconnectivity of resources and content delivery. Thus, an interest for this type of support was requested by both students and staff.

Concluding Thoughts & Moving Forward

"Digital teaching offers fantastic opportunities for us to be able to revolutionize what we do within the university but I think we're at the start of that journey, and I think we need to think very carefully about where we're trying to get to before we try and take any steps" (Teaching staff, Natural Sciences)

During the interviews, the following common threads were identified regarding digital teaching and learning and how respondents felt that it could be used going forwards:

- in many subjects, digital submission and marking of supervision work enabled students to receive and reflect on feedback before the supervision, providing a foundation for more advanced activities in in-person supervisions
- digital availability of lecture materials (whether recorded live and uploaded later, flipped learning models, or specific short pre-recorded lecture content) should be retained
- there should be further exploration of pedagogically beneficial approaches to using online materials to enhance lecture and class learning
- students and staff hoped for continued increases in the availability and accessibility of online library materials
- students valued clear, single-access points for the curation of online course materials
- staff looked for improved support and guidance about how to make the most of digital teaching and learning and how to integrate it with in-person teaching

- a need for continued focus on accessibility for students with additional learning needs
- digital teaching and learning works best when driven by pedagogy first and foremost, rather than by technical ability. Recognising this is central to making the most of digital teaching and learning opportunities in the distinctive context of Cambridge's residential education.

Appendix: Digital Teaching and Learning in Higher Education - A Rapid Evidence Review

Introduction

The current public health crisis has resulted in a substantial proportion of teaching and learning in the University of Cambridge being undertaken online or in a blend with in-person activity since March 2020. As the immediate crisis of the pandemic begins to recede, it is timely to reflect on experiences, challenges and opportunities in order to inform the development during the next three to five years of evidence-informed support and training for teaching staff in Cambridge's distinctive, residential environment.

This rapid evidence review synthesises existing evidence and literature on digitally enabled teaching and learning in Cambridge and a sample of research-rich, residential higher education institutions. The aim of this rapid review is to develop a more coherent overview of what is currently a fragmented evidence base within Cambridge and to identify priorities for further research during the Easter Term 2021 into the experiences of Cambridge students and staff and the outcomes of support and training for staff in adapting to and improving online teaching and learning during the disrupted period.

The literature reviewed includes both pre- and during-pandemic publications, to capture any differences in approaches, their implementation, and their effectiveness, between pandemic and non-pandemic contexts. This research has a UK focus overall and a Cambridge focus specifically. There is little research on digital teaching and learning experiences and outcomes that is UK-centred and published recently, but before the Covid pandemic. Consequently, this rapid review also includes a selection of empirical work from other regions, such as the United States and Australia. Further to the literature, the evidence reviewed also includes a selection of institutional reports and surveys produced within the collegiate University.

Definition of Terms

There is a wide range of terminology that is employed within digital education, and thus a need exists for common language usage (QAA, 2020). The real challenge in terminology, at Cambridge and elsewhere, is effectively and accurately communicating and describing the digital teaching and learning experience in such a way as to ensure the collegiate University communities have the same level of expectation around the overall experience (QAA, 2020). For this rapid review, digital teaching and learning will be used as an umbrella term that refers to some online elements within the teaching and learning experience, either asynchronous (different time, different place) or

synchronous (same time, different place) (Ambler, Huxley, & Peacey, 2020). Under the digital teaching and learning umbrella there is a spectrum of experiences from online learning which is 100% online, such as those offered through MOOCs, to a residential learning experience, which is taught nearly 100% in-person, but incorporates a small number of digital elements such as the use of a Virtual Learning Environment (VLE), as was the experience for a majority of Cambridge undergraduate programmes prior to the pandemic. Blended learning refers to an experience located within the digital learning spectrum, with some in-person elements and some online elements, and can be either synchronous and asynchronous (QAA, 2020).

Background

We begin the rapid review with a brief background on the history of digital teaching and learning in the higher education sector in order to

- place Cambridge within this historical context, specifically in terms of the University's pre-pandemic digital teaching and learning cultures, and also to
- frame the 2020-2021 academic year, as well as future teaching and learning experiences, within the larger digital landscape.

Digital teaching and learning, as defined above, has existed within the UK higher education sector for decades, largely within highly specialised institutions. However, in more recent years (beginning in the 1990s) it has grown increasingly prominent across the sector, with the rise of both fully-online programmes and blended programmes that incorporate elements of digital learning into a traditional face-to-face experience (Bali & Liu, 2018; Kentnor, 2015). Some higher education institutions currently offer online-only courses: the Open University is a key provider of online higher education in the UK, offering both undergraduate and postgraduate level degrees. More institutions offer blended learning courses, again at both undergraduate and postgraduate levels (such as the University of Manchester, the University of Edinburgh, and Anglia Ruskin University, among others). A further area of growth is represented by massive open online courses (or MOOCs) such as edX, which are free online courses for anyone to enroll, and offered by a variety of providers including Imperial College London and (as of August 2020) the University of Cambridge.

Among the advantages claimed for digital teaching and learning are

- cost effectiveness (although this is heavily debated and politicised) (Fidalgo, Thormann, Kulyk and Lencastre, 2020; Poulin & Straut, 2017)
- flexibility unhindered by time and space (Lei & Gupta, 2010; Fidalgo et al, 2020)
- creating a personalised learning experience (Barber, 2021) and

- access for a range of student groups, including students with certain disabilities, international students, and students from minority ethnic groups (although digital teaching and learning also presents some challenges around the area of access, as discussed below) (Barber, 2021).

Emerging Challenges

With the emergence of digital teaching and learning, a number of challenges have also emerged.

These include:

- Compatibility with existing university cultures (Fidalgo et al, 2020)
- Professional development (Poulin & Straut, 2017)
- Equity and access (specifically who has access to the technology required to participate) (Bassoppo-Moyo, 2006; Barber, 2021).
- Adapting and updating the technological infrastructure (Poulin & Straut, 2017)
- Ensuring the learning experience is a quality one (JISC, 2020; Kebritchi, Lipschuetz, and Santiago, 2017).

Much of the critique surrounding the growth of online-only and blended higher education modes have centred around the perceived challenge of quality. Critics have argued that digital learning **lacks the communication patterns** (predominantly between teacher and student) (Markova, Glazkova & Zaborova, 2017), **access** (specifically technological access) (Bassoppo-Moyo, 2006), **time management** (Fidalgo et al, 2020), and **social interaction** (Zaborova & Markova, 2016) required to meet the quality standards of a more traditional learning experience.

Further critique has focused on the *outcomes* of students in online programmes when compared to what are presented as traditional face-to-face programmes. For example, a pre-Covid study (Patterson & McFadden, 2009) found that student drop-out rates were six to seven times higher in online programmes compared with equivalent residential programmes. When it comes to digitally enabled learning outcomes, however, the research is not straightforward. One study (Alpert, Couch, and Harmon, 2016) found key distinctions between online and blended learning. In the study, economics students at a large public university in the Northeastern United States were assigned to one of three learning experiences:

1. A 100% in-person classroom experience
2. A synchronous blended learning experience
3. An asynchronous 100% online learning experience

All students received the same teaching instruction. The study found that while the exam results for the fully online group were worse than the other two groups, there was little difference in outcomes between the students who learned via a blended or traditional classroom format.

Perceptions

Amidst the evolving presence of digital teaching and learning in UK universities, a statement by the Universities and Colleges Admissions Service (UCAS) reflects some of the perceptions and attitudes that exist around a digitally-enabled educational experience. UCAS states on their website that a digital learning experience best serves the following types of students:

- Mature students or those returning to education after several years
- School leavers
- International students
- Students who want to progress professionally
- Parents, guardians, carers
- Students who have health condition, disability, or other personal circumstances
- Students who don't have the strongest academic record
- Students who don't want to break the bank
- Students who are mainly focused on the qualification at the end
- Students who are independent learners (UCAS, 2021).

The UCAS information, alongside empirical work such as White, Warren, Faughnan & Manton (2010) and Garrett (2018) reveals larger *perceptions* that exist about digital teaching and learning (particularly fully online courses) and for which students it is most appropriate. Most specifically, there is a perception that digital teaching and learning is predominantly for adults and for students who are progressing through the educational pipeline via what are perceived as alternative routes (Garrett, 2018) and therefore offers a lesser quality learning experience when compared to what is perceived as a traditional in-person undergraduate course.

Existing perceptions were challenged in March 2020 when the Covid-19 pandemic forced all UK universities to adopt some form of online or blended teaching and learning for the 2020-2021 academic year (JISC, 2020). The rapid adaptation of digital teaching and learning stood in contrast to the pre-pandemic teaching and learning experience for many of these universities. JISC (2020) found that before March 2020 the majority of university teaching for undergraduate degree-seeking courses (aside from a few universities that specialised in online delivery) was still in-person, with the majority of digital teaching and learning used in specific technological enhancements such as VLE

(Virtual Learning Environments) like Moodle and the use of lecture capture (the practice of recording all lectures so that students can review past lectures) (Davies, Mullan, and Feldman, 2017).

Research (Fish & Gill, 2009; Wingo, Ivankova & Moss, 2017; Bali et al 2018) finds that overall perceptions about who should participate in a digital educational experience hinge largely on one's experience with it. For example, in these studies both teachers and students who had positive digital learning experiences felt that the experience was equivalent to a traditional in-person learning experience, while those who had never taught and/or learned in a digital learning environment maintained perceptions that it offered a lesser quality experience than traditional teaching and learning.

The research reveals a link between experience and perception when it comes to digital teaching and learning within the overall higher education sector. However, for the purposes of this research, there is currently little data on the perceptions of digital teaching and learning at Cambridge (or similar residential, research-intensive universities' populations) before or during the Covid pandemic. Research (Fidalgo et al, 2020) shows that the perceptions and attitudes around distance education influence the development of guidance and recommendations for institutions considering incorporating digital elements into the curriculum. Consequently, developing an understanding of such perceptions should be a priority for the empirical phase of this research, as it is likely to have implications on future teaching and learning delivery at the collegiate university. Thus, there is a need to understand interview responses in the context of respondents' previous experiences and perceptions, as such an understanding can help to identify digital education approaches that are perceived as having educational value and which could be expected to become sustainable features of teaching and learning during the next three to five years.

Digital Teaching and Learning Cultures at Cambridge

Prior to the Covid-19 pandemic, digital teaching and learning elements existed in a number of different capacities at Cambridge, ranging on the spectrum of digital teaching and learning (as identified on page 2) from the residential undergraduate experience, which incorporated only the use of Moodle, to the Institute of Continuing Education (ICE) which operated fully online short-term courses and 1-year, part-time accredited undergraduate diplomas and certificates. Furthermore, certain faculties and departments offered a range of blended learning programmes (mostly at the graduate level) which operate somewhere between residential and online on the digital teaching and learning spectrum. So while there was a range of digital teaching and learning practices taking place at Cambridge, there was little connectivity across the University.

With the arrival of the Covid-19 pandemic, however, some of those distinctions were removed as Cambridge, alongside the majority of UK universities, saw a complete shift in how traditional residential programmes were taught with all undergraduate teaching moving fully online. **Thus, digital teaching and learning at Cambridge, which had previously been distinctive to ICE and a handful of graduate-level courses, now extended to the entire undergraduate community.** This resulted in a drastic shift in educational practices for both teachers and students, more so than, for example, a university such as the University of Manchester which had been offering a blended learning experience to students as far back as 1996 (Ferneley, 2018), and therefore had a culture which already included both residential and online teaching and learning components.

Research on Cambridge teaching and support staff

The dramatic shift in the delivery of undergraduate teaching is reflected in the high levels of anxiety and uncertainty experienced by Cambridge teaching and support staff. The *Teaching Resources Survey for Individuals Delivering and Supporting Teaching and Learning at Cambridge (2020)* found that respondents experienced high levels of anxiety in the Easter 2020 term impacting the “efficiency and effectiveness of their work” (UIS, 2020). Specifically, respondents expressed frustration and anxiety around learning new softwares and delivery methods for distance teaching:

“Teams seems user unfriendly, it’s hard to find what you are looking for in the menus. Setting up a videochat on Teams is not intuitive, and not as simple as Zoom. I still can’t figure out how to set up a "team" of people and simply start a videochat with them all at the same time, rather than calling them one by one.” (UIS, 2020)

“Nobody has yet been in touch with me about how to carry out remote lecture capture for next year. I have never done this before and will need guidance on the topic.” (UIS, 2020)

Approximately 43% of Cambridge teaching staff who responded to this survey reported using technical guidance and 45% reported using teaching guidance on the various tools and technologies available for remote teaching, suggesting a general lack of comfort and familiarity with the new delivery tools.

While UIS (2020) noted an overall theme of anxiety from the survey respondents, there was quite a lot of variation, with a number of positive responses to the Easter 2020 teaching experience, including a large number of teaching and support staff utilising Zoom and nearly 90% saying they were satisfied with the tool.

“Zoom is intuitive and works well, with things like annotation and whiteboard built-in.” (UIS, 2020)

Some respondents expressed a desire to continue using digital teaching tools in their post-pandemic instruction:

“Synchronous (with recording on) teaching is truly revelatory with Zoom technology. No one knew about it 5 months ago! Even top conference organisers did not know it was possible. This is a revolution in how we do things, from day to day interface and work to outreach and research collaboration.” (UIS, 2020)

It should be noted that Zoom was not without its challenges for staff, particularly the inflexibility of exceeding the 40 minute time limit for free accounts, resulting in staff submitting requests for access to department licensing or purchasing their own license out of pocket.

Further to the UIS (2020) survey, three case studies (Ghaffari, 2020; Mentchen, 2020; Radic, 2020) were conducted, in Asian, Middle Eastern and Persian Studies, in Cambridge University Language Programmes [which had a pre-pandemic blended teaching model], and Modern and Medieval Languages. All three studies included reflections on the pedagogical benefits of digital teaching and learning across the three departments, such as the ease of conducting and effective online supervision and the opportunities to make lectures more effective by pre-recorded them and breaking them down into short ‘chunks’. Furthermore, while showing degrees of variations in their findings and expressing some concerns over the challenges of learning a foreign language via an online format, overall all three concluded that they believed the involuntary shift to online learning would result in a change to future (post-pandemic) teaching and learning within their respective departments (Ghaffari, 2020; Mentchen, 2020; Radic, 2020).

Research on Cambridge students

Student feedback reflected less anxiety overall in the shift to digital learning. The Pulse (2020) survey – a short survey distributed to all Cambridge undergraduates and taught postgraduates in late November 2020 – received responses from 2,762 undergraduate students (21% of the total Cambridge undergraduate population) from 36 different courses, and found that 70% of undergraduates surveyed were satisfied with their digital learning experience (12.8% were not satisfied) during Michaelmas 2020.

It is important to note that the Pulse survey was framed within the context of the Covid-19 pandemic (“Given the impact of Covid-19, how satisfied are you with the quality of your course?”) and thus may not accurately represent how students felt about their overall learning experience when compared to their expectations around a non-pandemic learning experience. Here is another place with which the empirical work can gain further insight, by, for example, asking students (and teachers and support staff) *not* how satisfied they were with their 2020-2021 teaching and learning experience given the pandemic (as that reflects a crisis mindset) but how satisfied they were with the 2020-2021 experience compared with either their previous Cambridge teaching and learning experience (for 2nd and 3rd year students/ continuing teaching staff) or their *expectation* of the Cambridge learning experience (for 1st year/ new teaching staff). Framing the questions in this way will allow us to identify what students valued in both the digital and in-person experience, thus potentially providing the opportunity for more enriching teaching and learning as the effects of the pandemic recede.

Overall, however, given the forced move to digital learning, there was a fairly high level of satisfaction among students. Further to the Pulse (2020) research, a study conducted by the Cambridge Department of Psychology (2020) found similar results, with 90% of survey respondents reporting being satisfied and engaged with their course. Students expressed that they particularly valued the flexibility and autonomy of online learning, especially the recorded lectures (Psychology Survey, 2020).

However, as with the teaching and support staff responses, there was quite a range of variation among student responses from across the University. Common frustrations among students across survey responses include the isolation of online learning (Psychology, 2020), an overall desire for improved access to required resources/texts (Pulse, 2020) and at least *some* in-person teaching, particularly for supervisions or practicals (Pulse, 2020). Some students surveyed by Queens’ College (2020) described their online supervisions as ‘awkward’; others, however, commented that they appreciated what they perceived as the more inclusive nature of online supervisions.

Key Findings

This review has synthesised literature on digital teaching and learning within the UK higher education sector, and found a set of identified challenges (such as the lack of communication patterns and social interactions necessary for a quality experience) alongside some notable opportunities (such as flexibility and access). The research revealed that the spectrum for digital teaching and learning is vast, ranging from fully online to fully residential experiences (with a large number of blended options in between). Prior to the pandemic, Cambridge was situated fairly

squarely on the residential side of the spectrum. Although there were some department-specific digital teaching and learning opportunities, these were largely siloed within specific departments. Across Cambridge, there was limited connectivity between these areas of activity. The pandemic, however, forced Cambridge, and other similar research-based residential universities, to implement in a very short time, a digital teaching and learning experience that sits more squarely on the other end of the digital teaching and learning spectrum, with the majority of classes offered online.

Since the forced shift to digital teaching and learning, there has been little research on the best practices, perceptions and experiences of Cambridge students and teaching staff, although there was some department- and college-specific research conducted in Easter 2020. This research, which focused mostly on the pandemic-driven shift to digital teaching and learning, found that high levels of anxiety existed among students and staff in spring 2020, largely driven by the rapid nature of the shift and anxieties about the pandemic overall. While the research illuminates how successfully certain departments and colleges were able to pivot online, it does not provide an in-depth understanding of successful practices and patterns of support across the university, as those had yet to be established at the time of the research.

Concluding thoughts & priorities for further research

The focus of the qualitative portion of this research will be addressing the gaps found within this rapid evidence review including the need to understand the experiences of students and staff in the 2020-2021 academic year within the context of their previous perceptions around digital teaching and learning, as well as their expectations as to what a Cambridge education entails. Developing a deeper understanding of student and staff perceptions and experiences will allow for a better understanding in how to adapt elements of the digital teaching and learning experience to successfully fit within the teaching and learning cultures at Cambridge in the next three to five years.

Specifically, the priorities for the next phase of research include:

- Understanding digital teaching and learning practices and cultures at Cambridge, specifically identifying what students and staff valued in the digital experience *and* in their prior residential teaching and learning experiences in order to illuminate overall valued practices that might enrich future teaching and learning.
- Understanding patterns of support and resources and how they influenced the perceived quality of the digital teaching and learning experiences

- Identifying both current and pre-pandemic perceptions around digital teaching and learning in order to determine if and how they have shifted or been impacted by the 2020-2021 experience.

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