Hybrid Teaching: a futurist model or a realist model for the future?

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Executive Summary

Definition

In this report, the term 'hybrid teaching' is used to refer to lectures/seminars/classes in which some students are physically present in a classroom and others join online simultaneously from remote locations.

Background and aim

When the Covid-19 lockdowns were lifted in the UK in mid-2020, some students returned to campus, but others were not able to do so due to travel restrictions or self-isolation requirements. To enable all students to continue studying, many institutions rapidly revised their teaching delivery modes to include hybrid teaching. The aim of this study was to learn from the key stakeholders of this hybrid teaching experiment – students, academics, and IT/Audio-Visual (IT/AV) staff – about the challenges and successes of the approach, and to gain insights into the future potential for post-pandemic hybrid teaching. The study was guided by the following research question:

What pedagogical rationales for, and models of, hybrid teaching can be identified to inform the development of inclusive and sustainable education for the future?

Institutional landscape

The two case study institutions are the University of Nottingham (UoN) and the University of Birmingham (UoB). At UoN, there were no prescribed ways to implement hybrid teaching. At UoB, several teaching spaces were converted into hybrid teaching rooms using Zoom Rooms. There were two room configurations: large hybrid teaching rooms with a capacity of over 100, and small hybrid teaching rooms with a capacity of less than 25. Training and support were available to teaching staff in both institutions.

Contextualisation

To inform this study, selected publications from the recent literature on hybrid teaching in higher education were reviewed. According to the systematic review by Raes et al. (2020), existing research suggests optimism about synchronous hybrid learning, as it creates a more flexible, engaging learning environment when compared to fully online or fully on-site instruction. Hybrid teaching is generally regarded as a practice that fosters equality, diversity and inclusivity (Kohnke & Moorhouse, 2021; Nørgård, 2021; Singh et al., 2021; Thomas & Bryson, 2021), although concerns have been raised about the capabilities of the most disadvantaged students to participate equally (QAA, 2022b). Raes et al. (2020) argue that synchronous hybrid education needs more empirical investigation; the current report responds to that call.

Methodology

Ethical approval was obtained from both universities to conduct the research. Data were gathered via surveys and focus groups. Across both institutions, the student survey attracted 564 valid responses; 40 academics responded to surveys or participated in focus groups; and nine IT/AV staff participated in focus groups. All survey data were analysed using descriptive statistical analysis on the quantitative questions and inductive thematic analysis on the qualitative questions. The focus group data were analysed using a combination of deductive and inductive thematic analysis. The project team conducted manual coding of the data, collaborating via MS Teams and other Microsoft

tools. To facilitate information sharing and smooth collaboration, weekly synchronous team meetings were held, as well as frequent smaller meetings between different team members. The study was conducted between May and July 2022.

Key findings

The following five themes emerged from the student data:

1. Flexibility and convenience were appreciated by students:
    - Choice was universally viewed as positive
    - The possibility for "flipped" learning: some students read the lecture materials on the VLE before the lecture and come prepared with questions
    - Attendance and time management: some students appreciated the extra time gained by not commuting, but some struggled to manage their time
2. Technical considerations
    - Teacher's digital skills were perceived to be lacking in some instances
    - Issues with technology: there were many reports of technical problems, particularly audio
3. Differences between the online and the in-person experience
    - Engagement, motivation and focus: attendance in-person was generally seen to be more engaging
4. Sense of community, social engagement, collaboration
    - Interaction and communication: interaction between on-site and online students was often limited or non-existent
    - Social activity and collaboration: online students often felt isolated
5. Accessibility and inclusivity
    - Live captions, transcripts and recording were valued by students
    - Government guidelines and Covid restrictions affected whether students attended in-person or online
    - Transport/commuting: the option to attend online allowed reduction in travel
    - Financial: some students saved money by not commuting to campus
    - Physical disability, health issues, learning difficulties, anxiety and neurodiversity: students who raised these issues generally appreciated the hybrid format
    - Parents and carers: the option to attend online was more inclusive

Five major themes arose in the data from academics:

1. Student behaviours and expectations are changing: in many cases, total attendance at online lectures increased, while on-site attendance decreased
2. Hybrid teaching can increase inclusivity, but needs to be implemented with care
3. Hybrid teaching can increase inequality if not carefully managed
4. Maintaining teaching quality requires sound infrastructure and ongoing technical support
5. New pedagogical approaches are needed to foster student engagement in hybrid teaching; particularly important is the need to manage two groups simultaneously

Four priority themes emerged from the IT/AV staff:

1. Room equipment: consistency of quality of equipment is needed across teaching venues
2. Technology and its use by the academics: the rapid implementation of hybrid teaching was challenging for many teachers, who had to learn new skills quickly
3. Communication: more communication is needed between academics and IT/AV staff
4. Future requirements: more discussion/consultation is needed around strategy, infrastructure and resourcing

Conclusion and recommendations

The study provides evidence that hybrid teaching can be more inclusive in terms of catering for students with diverse personal-life related circumstances such as caring for others, commuting, visa requirements, etc., as well as in terms of accessibility, i.e., enabling and facilitating the participation of neurodiverse students as well as those with physical disabilities, mental health issues and anxiety. In addition, access to live captions, transcripts and the ability to control the viewing of lecture recordings all arose as prominent inclusivity themes. Students valued the flexibility and choice of hybrid teaching, and there was evidence of increased attendance at teaching sessions. The sustainability of hybrid teaching is unclear, with a major concern being the added workload for academics involved in preparing for and delivering hybrid teaching, which many academics said was overwhelming and personally unsustainable for them. Adequate resourcing of hybrid teaching will be essential to its ultimate sustainability. Further research is needed to understand the potential disadvantages for students, e.g., in relation to digital poverty. Further research is also needed to understand how best to support teaching staff in developing their digital and pedagogical skills for hybrid teaching.

The study concludes with the following recommendations:

- **Provide appropriate staff training for academics:** Develop a comprehensive training programme to support the development of the pedagogical and digital skills required.
- **Provide sufficient human resources for hybrid teaching delivery**: academics need support in teaching two groups of students simultaneously; a teaching assistant can add substantial value.
- **Provide comprehensive pedagogical support:** This should address learning design for hybrid teaching, and any modifications to associated assessment.
- **Provide appropriate technology solutions and technical support:** Teaching spaces for hybrid teaching need to be set up appropriately. Technology needs to be reliable and simple to use.
- **Consult with stakeholders:** Ensure that decisions about hybrid teaching are not rushed through without proper staff consultation or consideration given to the practical or pedagogical implications.
- **Develop a hybrid teaching policy:** This should at least specify the segment of the student body that hybrid teaching is aimed at.
- **Manage expectations:** Raise staff awareness about the possibilities and pitfalls of hybrid teaching, and develop a transparent communication strategy for students.
- **Communicate:** Ensure communication amongst stakeholders to ensure synergy between the pedagogy, the technical infrastructure, and the strategic plans to implement it.

1. Introduction to the study and landscape

1.1 Aim of study

In the academic year that followed the first lockdown in 2020, UK campuses and classrooms opened again their doors to students and developed a variety of mixed-mode delivery approaches to cater for those students who were able to return to campus as well as for those who were not able to do so. During this Adapted Remote Teaching (Goria 2021) phase, national and international health restrictions meant that a significant and changing number of students were unable to attend classes physically and therefore were given the possibility to take modules remotely. Many institutions started using "hybrid teaching" for the delivery of lectures and seminars, in which some students were physically present in a classroom and others joined online simultaneously from remote locations. Plans for hybrid teaching had to be drawn up and implemented rapidly, with little time for lengthy strategic discussions within university leadership teams.

The aim of this study was to learn from the key stakeholders of the hybrid teaching experiment in two UK universities – students, academics, and IT/Audio-Visual (IT/AV) staff – about the challenges and successes of the approach, and to gain insights into the future potential for post-pandemic hybrid teaching.

The study was guided by the following research question:

What pedagogical rationales for and models of hybrid teaching can be identified, to inform the development of inclusive and sustainable education for the future?

1.2 Defining hybrid teaching

Several terms are used to refer to the mode of teaching that mixes both face-to-face and online delivery, whether synchronously or asynchronously. The most common terms encountered are Hybrid-Flexible (HyFlex) and Hybrid. As the name implies, HyFlex describes the most flexible arrangement, from the students' point of view:

> *[A] Hybrid-Flexible (HyFlex) course design enables a flexible participation policy for students, whereby students may choose to attend face-to-face synchronous class sessions in-person (typically in a traditional classroom) or complete course learning activities online without physically attending class. Some HyFlex courses allow for further choice in the online delivery mode, allowing both synchronous and asynchronous participation"* (Beatty, 2019, p. 33).

At the two institutions investigated here (see below), the students were not given the choice to attend in person or online. Instead, students were either granted remote study for the entire course, if they could not travel to campus, or attended some teaching sessions remotely due to isolation requirements. In other words, the hybrid teaching set up was so that the flexibility in attendance mode was dictated by needs rather than by choice of the individual. That said, in practice students felt that hybrid teaching did give them a certain degree of choice and flexibility, as it transpires from the student survey data presented in section 4.1.

In this report, we use the term 'hybrid' to refer to lectures/seminars/classes in which some students are physically present in a classroom and others join online simultaneously from remote locations.

1.3 Landscape

The two case study institutions are the University of Nottingham and the University of Birmingham. Both are research-intensive universities located in the Midlands of England.

1.3.1 *University of Nottingham*

At the University of Nottingham, during the academic year 2020/21, due to the issue of international students being unable to attend on campus and other students being required to self-isolate due to Covid-19, except during periods when government guidance was to stop in-person teaching, (when teaching sessions were necessarily delivered online), the recommendations were for lectures to be recorded and delivered asynchronously on-demand, with supporting lecture engagement sessions. Lecture engagement sessions were delivered online at a set time during which the teachers of the pre-recorded online lectures were available to discuss the content of the lecture. Students were able to ask any questions at these sessions. Seminar sessions were delivered in person whenever possible with an additional hybrid delivery option to ensure that those students who could not be physically present could continue to benefit from the interactive experience with peers and tutors. In some cases, where there were large numbers of students unable to attend physically, separate online seminar sessions were also arranged.

All classrooms and lecture theatres at the University of Nottingham were already equipped with at least one computer with a webcam, a microphone, and a projector screen (to facilitate the existing well established and widely used site-wide lecture recording service – Echo360). Lecture theatres had at least one additional camera and visualiser as standard. Some of the newer rooms had at least one Microsoft Surface Hub that could be called into Teams meetings providing additional student presence and interactivity. All rooms had a simple control panel to control the room devices with which staff are already familiar. To support hybrid teaching, Microsoft Teams was installed in all these rooms, integrated as much as possible with the existing audio-visual (AV) system. A team of IT and AV staff and learning technologists was available to support academic staff, on site or online, through training sessions as well as online drop-ins (available daily from 8am to 4.30pm), where any academic encountering technological difficulties could post questions using the chat function.

In terms of hybrid delivery, there were no strict instructions provided by the Schools or Faculties. In addition to MS Teams and Echo360, the methods and tools used were down to the personal choices of each teaching staff member. They had the possibility of using online collaborative platforms, such as Echo 360 polling and Question & Answer, Padlet and Talis Elevate (for which the Faculty of Arts purchased a license), that allowed every student equipped with an appropriate device (laptop, tablet or smartphone) to contribute to a given activity regardless of their mode of attendance. Such interactive and collaborative activity would also be possible by using Microsoft Office shared documents.

These activities would, however, depend on the time and devices available, the technological proficiency of both the teacher and the students, and the reliability of the technology in place. Training was available to use such teaching methods, via MS Teams or as standalone workshops (generally online). For instance, the Learning Technology team regularly held training sessions such as “MS Teams for Teaching”, “Echo360 interactive activities” or “Microsoft Forms for Teaching”. However, attending such training was on a voluntary basis and would come on top of an already increased workload, with little if no possibility of compensation. It was not uncommon that online students, especially if there was only one, would follow as “auditors” on Teams (i.e. they would merely watch and listen with little or no participation in learning activities), with the teacher sharing the screen, and using the chat function to contribute to discussions or ask questions. Students could also be divided in groups depending on their mode of attendance, thus limiting the interaction between online and face-to-face students.

1.3.2 *University of Birmingham*

At the University of Birmingham, during the academic year 2020/21 many lectures were recorded and delivered asynchronously on-demand, and large group Question & Answer sessions and seminar sessions were delivered in person with restricted numbers, whenever possible (apart from during periods of restrictions on in-person teaching, when all synchronous teaching moved fully online).

During the 2021/22 academic year international students continued to experience difficulties with travel and many were unable to return to in-person on campus teaching. Hybrid teaching options were developed to cater for the international student population unable to attend campus or for locally based students who had to self-isolate due to Covid-19.

The University of Birmingham converted several small and large teaching spaces into hybrid teaching rooms that allowed for the synchronous teaching of students both in the classroom and remotely on Zoom. There were two room configurations: firstly, large hybrid teaching rooms with a capacity of over 100, and secondly, small hybrid teaching rooms, with a capacity of less than 25. The large rooms were equipped with a sophisticated audio-visual installation, on top of the existing infrastructure, comprising an audio-visual control panel, a Zoom Room control panel, ceiling-mounted audience microphones, and presenter and 'audience' cameras. Hybrid teaching operation was via the dedicated Zoom Room control panel. The small rooms had a single Crestron sound bar wall-mounted above or below the existing projection screen (containing microphone, speakers and a single camera for the room) which was connected to and operated from the lectern PC.

A hybrid teaching pilot was carried out from January to April 2021, with two rooms in Birmingham's 'Teaching and Learning Building', fitted out with the 'large room' Zoom Room equipment. The pilot project was initiated by IT and AV staff and the Estates department. Once the installation of pilot equipment was well advanced, the Higher Education Futures institute (HEFi) was brought into the project to coordinate academic involvement in the pilot and to provide guidance and pedagogic support to academic colleagues.

As part of the pilot, HEFi ran demonstration sessions for academics, and some hybrid teaching sessions were timetabled in the two pilot rooms; however, due to the ongoing Covid-19 restrictions, most teaching continued to be delivered wholly online during this period, and pilot sessions in the hybrid teaching rooms were restricted to specific government approved disciplines only. In May 2021, the university approved a wider rollout of the pilot technology into a total of 22 large teaching rooms and 44 small teaching rooms. The rooms were timetabled for hybrid teaching from the start of the 2021/2022 academic year, i.e. from 27th September 2021, with priority given to modules with large international cohorts.

2. Contextualisation

2.1 Overview

To inform this study, a search for literature on hybrid teaching in higher education published between 2020 and 2022 was conducted. It as found that many studies reported in the literature were descriptive case studies; however, the systematic literature review by Raes et al. (2020) and a follow-up paper by Raes (2022), along with Beatty's (2019) book on HyFlex teaching, provided a more holistic overview of emerging practices in the field. Key insights from the literature reviewed are summarised below.

Raes et al. (2020) provide a review of 47 studies concerned with some forms of hybrid teaching focussing specifically on the dynamics of the synchronous dimension of the practice. They found that existing research suggests optimism about synchronous hybrid learning as a future alternative that

creates a more flexible, engaging learning environment, when compared to fully online or fully on-site instruction. The review also found that hybrid teaching creates a new learning space with its own challenges, of both a pedagogical and a technological nature. To meet these challenges, the authors formulated several design guidelines. For example, they suggest the use of a human 'technology navigator' or 'operator' who is present in every class to help alleviate the many challenges that teachers face in this new context. The study also found that most of the existing literature is exploratory and qualitative and has focused mostly on descriptions of students' experiences, organisational implementation, and technological design. Some empirical studies have only begun to emerge, and more research is suggested on different pedagogical scenarios and their impact on student outcomes.

Beatty (2019) provides a comprehensive overview of a version of hybrid teaching called HyFlex – an abbreviation of Hybrid-Flexible – and refers to a type of course design which, in addition to being hybrid, is also flexible, in that it allows students to choose their way of participating in each class session. Students attending HyFlex mode courses have full choice as to whether they attend online, face-to-face, or asynchronously, or in a combination of all three, and are expected to achieve the same learning outcomes regardless of their chosen mode. This level of flexibility applies to each individual session. By presenting a number of case studies, Beatty's work illustrates the different dimensions of application of HyFlex, ranging from one instructor's implementation with their students at a single institution, to the broader adoption efforts in entire programs – or, in rare cases, across an institution. There is an embryonic body of research on the impact on student learning and associated metrics such as retention, passing grade, time to graduation, etc., and more such studies are expected in future.

The two publications outlined above included studies primarily published between 2003 and 2018. Further analysis of other literature published between 2020 and 2021 suggested similar findings to these reviews.

2.2 Hybrid teaching – technology challenges

When drawing out the challenges linked to hybrid teaching, communication between the teacher and the students or between online and in person students came to the fore (Kohnke & Moorhouse, 2021). Technology is a key component for effective communication and was also often identified as a potentially problematic area, for example, in terms of bandwidth quality, devices, classroom equipment, and lack of support and training for staff (QAA, 2022b). In particular, hybrid teaching comes with a high cognitive load (Detyna et al., 2022), also called "hyperzoom", or "hyperfocus" (Raes et al., 2020, p. 283), for both teachers and students.

2.3 Hybrid teaching – equality, diversity and inclusion

Hybrid teaching is regarded as a practice fostering equality, diversity and inclusivity (Thomas & Bryson, 2021); during the pandemic it aimed to cater for students likely to be unable to physically go to campus from one day to the next due to health issues, in cases where students were in quarantine or had to self-isolate; or for the whole semester/year, in cases where remote students faced travel restrictions. Students appreciate the flexibility and safety that hybrid teaching offered, as they can still attend classes synchronously, ask questions of the teacher directly and engage in related learning activities (Kohnke & Moorhouse, 2021; Singh et al., 2021).

Despite these benefits, there is evidence that students experience courses differently, depending on whether they attend online or face-to-face (Beatty, 2019; Raes, 2022). The design of the virtual learning space and the actions of the teacher are found to be key to the experience of students attending online, directly influencing their engagement and feeling of presence (Detyna et al., 2022; Nørgård, 2021; Raes, 2022), even though there seem to be no significant difference in terms of

conceptual understanding of subject knowledge (Raes, 2022). There is a particular concern from academics that hybrid teaching could increase inequalities, especially for those students learning online, as they must rely more on the quality of their personal equipment and environment. In the QAA's *Made Digital* report, around 42% of educators in the study thought that "the achievements of students from poorer socioeconomic backgrounds was most likely to be negatively affected by the shift to online teaching and learning" (QAA, 2022b, p. 13).

Furthermore, the social aspects related to communication between students, the possibility of making friends, the sense of belonging, and other more informal aspects of student life, are seen as important in preventing feelings of isolation among students; equally important is the students' oft-stated desire for live interactions with their teachers, preferably in face-to-face settings (QAA, 2022a, 2022b). Teaching staff may therefore feel additional pressure to ensure that students receive a comparable educational experience whether attending online or face-to-face (Kohnke & Moorhouse, 2021).

Generally, research shows that, under the right conditions and with adequate support and preparation, modes of teaching delivery such as hybrid (or Hyflex) have the potential of making education more inclusive and accessible to a broader category of students (Nørgård, 2021). The option to attend either online or face-to-face could potentially help mitigate the potential disadvantages experienced by some students; it allows students to gain a sense of ownership over their learning, and for the institution to enhance student recruitment and retention (Singh et al., 2022).

2.4 Future of hybrid teaching practices

The increased cognitive load and workload involved in hybrid teaching in terms of preparation, administration and delivery has led many staff members to question whether such a practice is sustainable (QAA, 2022b). It is still unclear, in fact, whether the high-level transformations that hybrid teaching requires constitute desirable pedagogical as well as business goals for UK HE institutions to aspire to.

That said, it is important to recognise that the current preference of many HE institutions to 'snapback' (Bryant 2021) to pre-pandemic practice is rather anachronistic and unrealistic given the remarkable shift to digitalised education undertaken in response to Covid-19. As Bryant (2021) states "we can't afford to rinse and repeat the ways in which we have always done teaching and learning, or to uncritically snapback to how we designed, delivered and assessed education in 2019". Instead, it seems more viable to capitalise on the recent past experiences and focus on developing space agnostic education (Bryant 2021), while gradually moving towards what Nørgård et al. (2019) call the "networking university", where geographical limitations are lifted, allowing learning and expertise to circulate.

3. Methodology

3.1 Ethical approval

Ethical approval was obtained from both the University of Nottingham and the University of Birmingham's research ethics panels.

3.2 Research design

The study was conducted using mixed methods, combining qualitative with quantitative data analysis to provide an overview of key themes among the student and staff populations (academics and IT/AV technical support staff) at both institutions and some in-depth analysis of lived

experiences of hybrid teaching and learning, with a particular focus on aspects around equality, diversity and inclusion.

Three stakeholder groups were identified and separate research instruments were constructed in accordance with the characteristics of each group, as outlined in the table below:

Stakeholder group	Research instrument(s)
Students	Survey
Academic Staff	Surveys (at both institutions) Focus group (at the University of Birmingham only)
IT/AV technical support staff	Focus group (at both institutions)

3.2.1 The student survey

3.2.1.1 Survey design

The aim of the student survey was to gather impressions based on past experience and opinions on potential future opportunities. Thus, the research design phase of the student survey included a focus on two conceptual frameworks, namely the "Unified Theory of Acceptance and Use of Technology" (UTAUT) (Venkatesh et al., 2003) and the COM-B model (Michie, 2014); two behavioural models that enable the identification of areas of intervention and user attitudes towards technology. The combination of these two frameworks to construct the key questions/ statements included in the student survey was deemed relevant in addressing the overarching objective of this study, to inform the development of inclusive and sustainable education for the future.

The UTAUT model explains user intentions to use an information system and subsequent usage behaviour. UTAUT originally theorised that four factors play a significant role as direct determinants of user acceptance and usage behaviour: performance expectancy, effort expectancy, social influence, and facilitating conditions. The model was later revised (UTAUT2) to include three more factors: hedonic motivation, price value, and habit (Venkatesh et al., 2012). By including these factors, the prediction of behavioural intention to use technology expanded from an organisational context to an individual use context. In the context of hybrid teaching research, one recent study uses UTAUT2 as the conceptual framework to investigate online and hybrid teaching adoption by Higher Education instructors in a review of exemplary existing research (Weilage & Stumpfegger, 2022). These authors found that the model allowed them to "identify arguments and reflect on the practical implications of hybrid and online teaching" (*ibid:* 113) and make recommendations to institutions.

The COM-B model of behaviour is widely used to identify areas of intervention for a behaviour change to be effective. It considers behaviour as generated and influenced by a set of interacting factors: capability, opportunity, and motivation. These categories allow us to identify the strengths and barriers of a behaviour (in this case, engaging in hybrid teaching as a learner) and can therefore be used to target areas of intervention for future decisions and recommendations. In the context of hybrid teaching research, the adoption of the COM-B framework facilitated the understanding of

behavioural changes, and barriers to such changes, in a medical programme where the delivery of teaching had to be partially moved online due to Covid-19 (Weisshardt et al., 2022).

All of the questions in the survey for the collection of quantitative data (Questions 13 to 26, where participants were asked to rate statements from strongly agree to strongly disagree) were developed based on the key factors identified in UTAUT (performance expectancy, effort expectancy, social influence, and facilitating conditions) and the COM-B categories (capability, opportunity and motivation). Questions 11 and 12 (the main advantage and challenge when participating to Hybrid teaching sessions), question 30 (reasons for preferring to attend face-to-face, online, or a mix of both) and question 32 (reasons for having benefited from Hybrid teaching overall, or not) were also aligned with these categories and factors. While it was beyond the scope of this study to apply these conceptual frameworks to all aspects of the research design, it is recognised that the application of the UTAUT and COM-B framework to analyse the data gathered through the student survey will help shed light on student acceptance of hybrid teaching and identify related strengths and barriers in the future.

3.2.1.2 Response to the student survey and demographics of the student survey respondents

The student survey was sent to students at both universities. There was an incentive of a prize draw (£50 and £20 Amazon vouchers). Students willing to take part were required to provide their email address. The prize recipients were chosen using participant ID and email using the online tool www.wheelofnames.com. The survey received a total of 564 valid responses: 254 from Nottingham and 310 from Birmingham.

The demographic profile of the student survey respondents is summarised in the tables below:

What is your level of study in university?				
	Foundation Year	**Undergraduate**	**Postgraduate**	**Total**
University of Birmingham	16	185	109	310
University of Nottingham	4	176	74	254
Total	**20**	**361**	**183**	**564**

Student Gender	**Number**	**Percentage**
Female	354	62.8%
Male	198	35.1%
Non-binary	2	0.4%
Prefer not to answer	8	1.4%
Prefer to self-describe	2	0.4%
Total	**564**	

Student Age	Number	Percentage
Under 18	1	0.2%
18-24	461	81.7%
25-34	86	15.2%
35-44	11	2.0%
45-54	3	0.5%
55-64	1	0.2%
Prefer not to answer	1	0.2%
Total	**564**	

Choose one option that best describes your ethnic group or background	Number	Percentage
Asian/Asian British	277	49.1%
White	208	36.9%
Mixed/Multiple ethnic groups	25	4.4%
Prefer not to answer	24	4.3%
Black/ African/Caribbean/Black British	14	2.5%
Other	16	2.8%
Total	564	

Regarding the breakdown of local versus overseas students, from the student data provided, it is estimated that approximately 12-15% of respondents were international students who participated in hybrid teaching sessions for at least a portion of the term from their home locations.

3.2.2 The academic staff surveys and focus groups

Obtaining data from academics was anticipated to be challenging, because of the timing of the study, which coincided with exam marking and the start of the summer break for most academics; also, data had to be gathered within a two-week window in order to fit the time frame of the study. Considering the time constraints, different methods were considered to be appropriate for each

institution. The University of Birmingham had previously gathered data from academics via a targeted survey in 2021, and as ethical approval was granted for the use of this data, the University of Birmingham team invited academics to join focus groups, while the University of Nottingham developed a separate survey for academic staff.

The University of Nottingham's survey received 11 responses (see Appendix B). The dissemination of the survey was targeted in that it was sent only to those academics who had experienced hybrid teaching at some point during the pandemic. The academic staff survey comprised 24 questions, which included 5 demographic questions, 5 close-ended and 14 open-ended questions. The aim of the survey was to capture the academic staff perspective of the hybrid teaching experience, focusing on the type of technical support sought, the digital tools adopted, the student feedback received, the challenges faced, and the opportunities raised. Six of the respondents came from the Faculty of Engineering, and the rest from the Faculty of Science, the Faculty of Arts and other areas.

The survey of teaching staff at University of Birmingham (see Appendix C) prior to this study in October 2021 had received 27 responses. In addition, four focus groups were conducted, with a total of 10 academic staff members (see Appendix E). Because of overlaps between the survey and focus groups, the total number of University of Birmingham academic participants was 29. Just under half of these came from Business and Economics subjects, and the others included Engineering, Language Teaching and Communications, Computing and Research Methods, and extra-curricular courses such as Careers. Whilst the 2021 questionnaire had aimed to find out about academics' experiences of using the institutional hybrid teaching technology, the focus groups aimed to probe more deeply about how exactly the academics had implemented hybrid teaching, what challenges they had encountered, any highlights of their hybrid teaching experience, and their recommendations for future hybrid teaching policies and strategies.

3.2.3 IT/Audio-Visual (IT/AV) technical support staff focus groups

Both universities conducted one focus group with their IT/AV staff. (N = 7 from the University of Nottingham and 2 from the University of Birmingham) (see Appendix D).

The aim of these focus groups was to gather information on the technical challenges that the hybrid teaching experience had presented, to highlight points of weakness and strength of the technical support provided and to identify the technical requirement to support future development of the practice.

3.3 Data analysis

Data analysis was conducted by a team drawn from both institutions, comprising three student interns, one academic, and seven professional services staff. All members of the team were working from different locations, using MS Teams to communicate and to share work-in-progress. The data analysis methods were as follows.

3.3.1 Survey data

All survey data (student and staff surveys) was analysed using a combination of descriptive statistical analysis on the quantitative questions and inductive thematic analysis on the qualitative questions. For the inductive analysis, a spreadsheet was developed for each survey with a separate page for each qualitative question. The participants' responses were placed in the first column, and then a new column was created for each new theme that emerged as the respondents' comments were reviewed. Each time a theme was mentioned by a respondent, a marker was placed in the corresponding cell, facilitating the sorting of the data according to theme and a visual scan of the text to gain insights into the research participants' experiences. This enabled the project team to work collaboratively and transparently and to conduct peer reviews of each other's coding. The

interpretation of the qualitative data was triangulated with reference to insights gained from the quantitative data.
Microsoft Excel Pivot tables were used to tabulate the quantitative data collated from the student survey. Summary tables of responses for every question were generated and these were then considered in their respective contexts in the report. Where appropriate, cross tabulations were used to gain further granular insights into the meaning of the responses.

3.3.2 Focus group data

The focus group data was analysed using a thematic analysis. The project team used a shared spreadsheet for this process to ensure collaboration and peer review. Five overarching themes were identified before beginning the analysis, and each of these themes was given its own sheet in the spreadsheet; then themes and subthemes emerging from the data were listed on each sheet. The focus group interviews were recorded to generate the transcripts. The latter were later sense-checked and worked through line by line so that quotations could be mapped onto the sheets under the relevant headings, adding new sub-themes as needed.

3.3 Determining findings

As the analysis was being done by a distributed team, the project team members used a Padlet for recording key insights and observations while working through the data and for facilitating dialogue within the group about headline findings. Draft files containing work-in-progress and preliminary findings from the different stakeholder groups were kept in the shared Teams folders. Team collaboration was nurtured through regular weekly synchronous whole-team meetings as well as frequent smaller meetings between different team members as required. This ongoing discussion facilitated a shared understanding of the findings among project team members and informed the writing of the final report.

4. Key Findings

4.1 Student survey finding and analysis

The data presented and analysed in this section was gathered via the student survey, which received 564 responses from participant institutions. For the purpose of this report, no distinction is being made between the student responses from the University of Nottingham and those from the University of Birmingham. Instead, adopting an institution agnostic approach, the most prominent themes across the two institutions have been identified as follows:

- Flexibility and convenience
    - Choice
    - The possibility for “flipped” learning
    - Attendance and time management

- Technical considerations
    - Teacher’s digital skills
    - Issues with technology

- Differences between the online and the in-person experience
    - Engagement, motivation and focus

- Sense of community, social engagement, collaboration
    - Interaction and communication
    - Social activity and collaboration

- Accessibility and inclusivity
    - Live captions, transcripts and recording
    - Government guidelines and covid restrictions
    - Transport/commuting
    - Financial
    - Physical disability, health issues, learning difficulties, anxiety and neurodiversity
    - Parents and carers

4.1.1 Flexibility and convenience

Flexibility and convenience of hybrid teaching was a key theme within the student survey responses and many students highlighted the benefit for those attending online who would normally have to travel to attend face-to-face teaching. They also highlighted that hybrid teaching improved productivity by giving those attending online more time to attend to their other studies. Hybrid teaching improved attendance for students, whether they were commuters, international students, or students whose circumstances raised equality, diversity and inclusion issues (see section 4.1.5). Online access to lectures and seminars meant that students do not miss out on learning if circumstances prevent attendance in person. Choice was strongly associated with ease and fairness.

Students also recognised that the social elements of learning such as in person interaction, peer-to-peer communication and community were often negatively impacted when joining online.

4.1.1.1 Choice

Although in none of the two participant institutions hybrid teaching was set up to give individual choice as to the mode of attendance, in practice 83% of students reported that the hybrid format allowed them to choose their learning environment (Q25). Students who valued the personal choice that hybrid teaching gave them often cited safety concerns, health concerns, and mental health concerns. This also fed into balancing study with other commitments.

> *"I can choose my study environment, … and it makes my study flexible" (Q32, ID: 218)*

When asked to rank their preferred way of participating in lectures, seminars, or classes, only 37% put hybrid as their first choice – significantly less than the 53% of students who ranked face to face as their preferred ways of participating in lectures, but markedly greater than the 10% who ranked "all online" first. (Q27). Hybrid teaching was more popular as a second ranked option (47%) than the option of all students face-to-face (29%) or all online (22%) (Q27).

When preference for attendance (Q27) is matched against how students joined hybrid sessions (Q9), 74% of students who only joined hybrid sessions from the classroom ranked fully face-to-face as their preferred mode. For students who only joined sessions online, the largest proportion (40%) preferred fully online sessions with hybrid as their second option, and whilst 34% of students joining online do prefer the hybrid experience, they are fairly evenly split between their second and third preferences. Having all students join online is consistently the lowest ranking option, except in the case of those students who only joined online in hybrid sessions (Q9 & Q27).

Students were asked what mode of participation they would choose if offered a module taught in hybrid format. Nearly half (47%) responded that they would like the flexibility to attend sometimes face-to-face and sometimes online. Of the remaining 53%, 43% responded that they would choose to attend face-to-face and only 10% responded that they would choose to join online (Q29). Flexibility was equally popular for undergraduate (UG) and postgraduate (PG) students;

however, at PG level, a smaller percentage would choose online over face-to-face than at UG (PG 5% vs UG 11% choosing online) (Q29).

4.1.1.2 The possibility for flipped learning

In the context of students having more choice over their approach to learning, there were mixed responses to the availability of module content from the start of the course. Some students commented on the benefits of being able to 'flip' the learning by accessing the lecture content before the lecture:

> *"Able to do more in engagement sessions if we were able to watch pre-recorded lectures at home and prepare for the upcoming lecture. Allows for better use of time as I felt more comfortable with my knowledge and prepared to participate or discuss." (Q11, ID: 72)*

However, one student had a very different experience:

> *"Having access to all the course notes online at all times made lectures feel redundant, as I didn't have to be present and take notes; I would not be missing out on anything if I wasn't there and what the lecturer was explaining I already had learned, making it boring. Posting online resources and course notes days or even weeks in advance of the lecture removed the primary incentive for people to show up; to take notes; and negated the primary function of the lecture itself; to learn. People would take the lectures more seriously and be much more eager and interested in attending if the week's syllabus wasn't made available to them beforehand, and was perhaps posted afterwards as a revision-aid." (Q32, ID: 573)*

4.1.1.3 Attendance and time management

Attendance benefited from a hybrid teaching model as students were

> *"able to stay up-to-date whilst ill"* (Q11, ID: 138)

and it was easier to attend a class without travelling when circumstances required. 81% of students agreed or strongly agreed that hybrid teaching sessions allowed them to attend classes that they would have missed otherwise. Only 9% disagreed or strongly disagreed with this statement (Q21).

Time management was an area in which hybrid teaching was regarded as both positive and negative. If on the one hand it enabled personalise the learning schedule, it helped saving time that would otherwise be spent on travelling (see section 4.5). Some students noted that learning online needed,

> *"discipline to use that independence well" (Q27-28, ID: 48)*

and that

> *"[s]ometimes it's easier to be productive on campus as the environment is more work focused, and being at home can offer distractions." (Q12, ID: 48)*

One student commented:

> *"The online system made my relationships with members of staff impersonal, and there was a lack of a proper attendance system, so I would just ignore the parts of my course that I*

didn't like, such as having to contact my personal tutor or department staff during office hours over zoom." (Q32, ID: 573)

4.1.2 Technical Considerations

Although taking part in hybrid teaching was a new practice, access to it did not seem to cause difficulties for most students, as more than three quarters of them had an appropriate device (93%), access to study space (84%), IT skills (86%), and sufficient internet quality (76%) to attend hybrid teaching sessions online (Q13-Q15).

That said, technical considerations were frequently mentioned in the student survey – in terms of both the teachers' digital capability and general issues with technology.

4.1.2.1 Teacher's digital capability

57% of students surveyed agreed or strongly agreed that their teacher was proficient/familiar with the hybrid teaching technology, however 14% of students noted that lectures' confidence and capability with the new technology needed some work (Q18). One stated:

> *"[s]ome lecturers did not understand how to adequately set up and maintain a hybrid teaching session' (Q12, ID: 540)*

and another cited a

> *"[c]omplete inability of the lecturer to deliver her sessions in a hybrid mode. Constant sound issues and little or no attempt to draw in online participants" (Q12, ID: 173).*

This suggests that training for staff on using the available technology is essential when using hybrid teaching.

4.1.2.2 Issues with technology

Some students participating in a hybrid teaching session online, found issues with either their own technology or that of other peoples. Internet connections were a common reported problem in the survey text responses (despite only 6% of students disagreeing that they had sufficient internet quality (Q15)), as were audio and display problems.

Despite three quarters of students indicating that their internet quality (connectivity, speed, etc.) was sufficient for hybrid teaching sessions (Q15), 45% of students did experience communication issues with sound (for example, bad sound quality or that they could not hear the lecturer or the other students in the classroom or online) (Q16). The root cause of these issues was unclear; some certainly were technical (Q12, ID: 14, , ID: 284, , ID: 338, , ID: 362, , ID: 424, , ID: 447), whereas others were related to staff skills:

> *"Audio from the lecturer is not always clear… sometimes they tend to be away from the mic. The questions asked by other students won't be captured at all in the mic." (Q12, ID: 511)*

Audio difficulties were not experienced by everyone, as 30% of students disagreed or strongly disagreed that they had communication issues with sound (Q16).

Issues with the technology were reported to affect the recordings of some of the hybrid sessions with potential impact for students who wished to review them and use them for revision purposes.

"Sometimes, the recording sounds are unclear, and sometimes the teacher forgets to record at the beginning." (Q12, ID: 525)

It is also important to note that 4% of students disagreed that they personally had the necessary IT skills to take part in hybrid sessions (Q17)

4.1.3 Differences between the online and the in-person experience

Most students (70%) strongly agreed or agreed that they benefited from the hybrid teaching session format; agreement was higher for PG students (74%) than for UG students (69%). Only 13% disagreed or strongly disagreed that they had benefitted and 17% were neutral. Amongst the students that felt they did not benefit, the percentage was higher for UG students (14%) than for PG students (9%) (Q31). However, whilst flexibility was an overall benefit making this mode of teaching more equitable for all types of learners, it came through strongly from the survey that students felt that hybrid teaching sessions were more engaging for students who join in the room, and that students who joined online received less attention from teaching staff.

For example, it was said that lecturers,

"had to split their attention between the two groups" (Q27-28 ID: 244) "leading to a worsened quality of education" (Q12 ID: 174)

The experience was frequently highlighted as being worse for those engaging online in hybrid sessions,

"I believe nothing can replace the student face-to-face environment. The interaction, participation, and learning opportunity that is available in face-to-face classes is not available in Hybrid or online" (Q27-28, ID: 429)

"Overall, not good experience...Boring and not engaging as in person lectures" (Q12, ID: 115)

"little or no attempt to draw in online participants" (Q12, ID: 173)

"The seminar being an hour long, there was not sufficient time to be able to provide more time to interact or encourage online students to contribute in the classroom" (Q12, ID: 497)

This highlights some of the challenges with hybrid teaching and these are clearly not just to do with technology but to do with pedagogic approach and session planning. Online students,

"became secondary if a discussion was being had" (Q27-28 ID: 174)

and found it,

"[d]ifficult to ask questions online and felt a little awkward. Less efficient" (Q 12, ID: 356)

Furthermore,

"[f]ace to face encourages much more discussion and sharing ideas […]. All students being online was also good because you felt like everyone was in the same situation,

everyone was receiving the same attention etc. […] hybrid classes sometimes felt divided" (Q27-Q28 ID: 174).

Students were asked if they agreed that time was wasted in hybrid teaching sessions because the activities took longer than usual. There was an even split between students who agreed that time was wasted (37%) and those who disagreed (37%). 26% were neutral (Q19).

Finally, in comparing the face-to-face experience with the online experience in hybrid teaching, students often felt more motivated to participate when attending in person,

"it's much more motivating [to] have lectures in person" (Q12, ID: 67)

"it is harder to motivate yourself to complete an online lecture compared to if you were physically attending as only you hold yourself accountable. The engagement in online seminars was very poor and breakout rooms were usually silent with no discussion" (Q12, ID: 96)

"[h]ybrid lessons are definitely less engaging and less motivating, especially when the lesson is also being held in person" (Q12, ID:180)

"face-to-face classes make me more focused and efficiently absorb knowledge" (Q32, ID: 637)

Students cited that motivation to engage online was reduced as there was a separation from the student body and lecturer. Fully online students suffered from a lack of engagement and communication,

"if you're all online you don't really communicate between each other" (Q 27-28, ID: 340)

while those joining in person benefited from the direct engagement with peers and teachers.

Finally, while choice was regarded as a plus of hybrid teaching, some students made it clear that their motivation was reduced in online sessions. Some admitted that,

'if the option is there to join online I'd be tempted to do so, even if this means I am concentrating significantly less." (Q29-Q30, ID: 245)

4.1.4 Sense of community, social engagement and collaboration

The community environment provided by the university was negatively affected when engaging with hybrid teaching online.

'[o]nline interactions are not as good academically or interpersonally – e.g. for building rapport with tutor and students, checking understanding, remaining completely engaged, getting the most from the session.' (Q12, ID: 607)

"social interaction is reduced for hybrid students" (Q27-28, ID: 507),

"in person lectures are the only was [sic] to meet other people on your course outside of student organised events, which as far as I am aware, were either nonexistent or just drinking parties" (Q27-Q28, ID: 410)

"there was no personal connection with the lecturers or other students. It made it harder to ask them questions and made it harder to form friendships/bonds with students on the course which would have been beneficial both casually as well as for help with studies" (Q 12, ID: 253)

In terms of opportunities for collaboration, 44% disagreed or strongly disagreed, while 31% agreed or strongly agreed that collaboration between face-to-face and online students was easy in hybrid teaching sessions. 25% were neutral (Q20). The quote below lists some of difficulties encountered:

"[w]hen at home not being able to hear discussions in the room. Losing focus as I didn't feel involved. Difficulty connecting with people for group work. I have also witnessed people be excluded because the technology didn't work or the lecturer didn't know how to work it, they were just cut [off]" (Q12, ID: 377)

However, perception of ease of collaboration did vary with mode of attendance. Students that described their mode of attendance as *"only online"* reported a more positive experience of collaboration between the two groups (61% of students that said that they attended only online agreed or strongly agreed that collaboration was easy between the two groups) than their counterparts attending in the classroom (32% of students that reported attending "*only in the classroom"* agreed that collaboration was easy (Q9 and Q20)).

4.1.5 Accessibility and inclusivity

Another prominent theme that emerged from the student responses is concerned with the role of hybrid teaching in addressing accessibility and inclusivity issues.

4.1.5.1 Live captions, transcripts and recordings

Attending hybrid lessons online was regarded as beneficial with regard to the use of live captions and transcripts. However, it was not without challenges for some students,

"[t]he closed captions were very bad and when you cannot understand a lecturer whose English is not very good, then it's terrible" (Q12, ID: 438)

pointing to the difficulties posed by the inaccuracy of automated live captions.

Special mention by several students was made to how the recording of hybrid sessions enabled learning and made it more accessible. The quote below lists the benefits of recorded lectures:

'Being able to watch lectures at my own pace, sometimes I will have forgotten a concept, being able to pause the lecture to revise that concept means I'm not misunderstanding the rest of the lecture content. Also, being able to rewind is a huge help as sometimes I zone out for a second and then have no idea what's going on' (Q11, ID: 30).

Furthermore, there was evidence from several students to suggest that what they value is not merely the availability of lecture recordings, but that there was a perceived additional benefit to having recordings of lectures that they had attended, whether in-person or online. The following comments in response to the question: "What was the main advantage you found when participating in hybrid teaching sessions?" offer some insights here:

"The subtitles that come with recordings, the ability to rewatch the classes I might have attended in person." (Q11, ID: 199)

"[T]he lectures being recorded meant you could listen without having to worry about writing loads of notes and go back to the lecture to create notes at a later date" (Q11, ID: 246)

"I attend my in-person lectures and I love it but sometimes I want to go back and rewatch them to improve my notes afterwards." (Q11, ID: 218)

Despite the positive sentiments around lecture recordings, some students suggested that the convenience of being able to access recordings reduced their motivation to attend in person, and as a consequence some missed the opportunity to participate in the live session, which they felt was a more engaging environment and where questions could be asked more easily:

'[It would] [t]ake longer to complete watching [the] recordings as I'd pause a lot and take breaks throughout whereas in a normal lecture engagement session you can't do that' (Q12 ID: 72).

4.1.5.2 Government guidelines and covid restrictions

During the pandemic government guidelines varied,

"My area is also affected by COVID-19, and the government has locked down my city. Online teaching is undoubtedly the best choice for me" (Q27-28 ID: 406)

Both UK students and overseas students benefited from the flexibility of hybrid learning, as it enabled them to stay at home when the pandemic was at its peak:

"It was safer with Covid happening.' (Q31-Q32, ID: 109 it was 'effective in avoiding mass infections" (Q31-Q32, ID:370)

4.1.5.3 Travel/commuting

Commuting students' transport could often be a hindrance to their study,

"you can both save money from travel costs and to not get up at 5am just to attend one 9am seminar" (Q11, ID: 623)

Flexibility therefore made their experience of university better as it provides,

'convenience, meaning reduced travel times and ability to work from home' (Q11, ID: 25).

4.1.5.4 Financial

Even though, many students cited that in person classes were *'better value for money'* (Q29-Q30, ID:130), others suggested that,

"The ability to learn from home more frequently ultimately allows learners to save money because they will be travelling less" (Q11, ID:153)

4.1.5.5 Disabilities, anxiety and neurodiversity

Hybrid learning was claimed to improve accessibility for people with physical disabilities, learning difficulties or social anxiety by allowing them to choose how to access their education.

> *'Without the flexibility of hybrid teaching a group of students will always be worse off. If I did not feel like travelling to university, I did not have to. This saved me time and energy, and I could take in the information at my own pace; having a learning disability, this last point is crucial to me' (Q 11, ID: 104).*

> *'I sometimes get anxious in lecture halls so prefer to tune in remotely' (Q9-10, ID: 338)*

Similarly:

> *'I have autism so it's difficult to connect with people without being able to read their body language.' (Q29-30, ID: 217).*

Students were asked if hybrid teaching sessions themselves caused them any anxiety. One fifth were neutral when asked about anxiety, whilst 52% felt that hybrid teaching didn't cause them any anxiety. However, 28% of students did agree (21%) or strongly agree (7%) that hybrid teaching sessions caused them some anxiety (Q22) and students who indicated that they were anxious about hybrid teaching sessions were equally likely to have joined sessions only in the classroom or only online (24% of each agreeing that they had some anxiety with hybrid teaching sessions) (Q22 and Q9)).

4.1.5.6 Parents and carers

Students with caring obligations responded positively to hybrid or online teaching,

> *'I really value the option to attend online when, say, one of my children is ill' (Q29-39, ID: 607)*

> *'Hybrid also makes it easier for me to balance studying and my caring commitments' (Q29-30 ID: 164).*

4.2 Academic Staff

Amongst academics, a clear preference for face-to-face teaching was evident, but many staff also recognised the "massive opportunity" offered by hybrid teaching, with exciting possibilities for cross-campus teaching and networking between cohorts, as well as its value in mitigating unforeseen issues, such as pandemics or difficulties related to travel. Five major themes arose in the data from academics, which can be summarised as:

- Student behaviours and expectations are changing
- Hybrid teaching can increase inclusivity
- Hybrid teaching can increase inequality if not carefully managed
- Maintaining teaching quality requires sound infrastructure and ongoing technical support
- New pedagogical approaches are needed to foster student engagement in hybrid teaching.

4.2.1 Student behaviours and expectations are changing

Several respondents mentioned that there was higher attendance in hybrid sessions, which they attributed to the ease of participating remotely if needed; however, face-to-face attendance dropped off, as more face-to-face students chose to join online instead of coming to class.

Furthermore, among those students who continue to attend classes face-to-face, there was a tendency to also join online from the classroom – some students told their lecturers this was because they wanted to follow the live captions, and others wanted to participate in the chat.

Some academics reported that their students had adapted quickly to the new ways of interacting, and this seemed to be particularly the case where students were given structured opportunities to interact across the two modes. Where lecturers were able to set up group-work that involved both in-class and online students (e.g. through the use of physical breakout rooms on campus) the in-class students started to look out for their friends online, thus contributing to group cohesion. Such instances were reported from academics with cohort sizes ranging from below 10 to around 60.

New group dynamics emerged in some classes, as some of the "quieter" students who did not previously speak in class contributed via the Teams/Zoom chat. In cases where lecturers encouraged students in the room to log into the session too, there were some reported cases of very active participation in the chat from students across both modes, which led to a more "co-created" lecture experience, as the academic would use the chat to inform the direction of the lecture. These cases were irrespective of class size, but were reported in relation to postgraduate classes, where generally students were seen to participate in hybrid sessions more often and with greater confidence.

One surprising finding was that, as a result of the flexibility afforded by hybrid delivery enabling students to join classes from any location, several instances were mentioned of students joining classes while driving or riding a bicycle. In one case, the lecturer stopped the class to request the student to switch their camera off, as it was distracting other students and they were concerned for the driver's safety.

Another change in students' behaviour that is particularly interesting from a pedagogical point of view is that some students are reading the lecture materials in advance of the lecture, in order to be better prepared for the lecture. This arose because students were made aware by their lecturers that the lecture resources were available in the VLE in case of technology failure during the live delivery of sessions. These students sometimes bring pre-prepared questions to the lecture. This indicates the potential for hybrid teaching to be used for "flipped classroom" type learning to be built into the design of modules.

Finally, several academic respondents noted that students did not know what to expect in terms of their learning and teaching experience when the first pandemic lockdowns began 2.5 years ago; however, students now have higher expectations and are more likely to complain if they feel they are not getting a quality university experience.

4.2.2 Hybrid teaching can increase inclusivity

Academics gave many examples of the inclusivity benefits of hybrid teaching. Apart from catering for students affected by Covid-19 (either in terms of being "locked down" in a different location, or having to self-isolate), hybrid teaching also enabled students who were pregnant, caring for family members, waiting for travel visas, or facing other unforeseen difficulties in their personal lives to continue participating in class. Furthermore, they found that hybrid teaching enabled the merging and mixing of cohorts within and across programmes, allowing for wider social networking between students, as well as greater use of guest speakers, and the opportunity for academics to "drop in" to each other's classes across regions and campuses.

Academics also found that many students used the live transcript to support accessibility; and they noticed that students who had been shy to speak in class were often more willing to participate when they had the option to write in the chat instead. Many academics (even those whose experience of hybrid teaching was not positive) felt that students would expect to have the option of joining classes online in future, because of the flexibility it afforded and the accessibility benefits.

4.2.3 Hybrid teaching can increase inequality if not carefully managed

Academics are concerned that, despite the clear gains in inclusivity, the hybrid format might disadvantage remote students. They also worry that the online and physical students might feel disconnected from one another, creating an unwelcome divide between the two groups.

> *"I do feel that students on Zoom are at a disadvantage to those in the room. When you have so many students in both the room and on Zoom (and your session is only 50 minutes long with lots of content to deliver), it can be challenging to devote the same amount of time to both those in-person and those online" (Ac, ID: 17)*

Some academics expressed particular concern over the possibility of digital poverty in the online student population, observing that students following the class on a mobile phone or an outdated laptop or tablet will not have the same quality of experience as those joining on a modern laptop or desktop computer. They noted that some students joining from mobile phones had indicated that it was difficult, and in some cases impossible, to switch between applications such as Zoom and polling, thus missing out on planned interaction. Also, there were regular instances reported of student drop-outs during hybrid teaching sessions due to connectivity issues. Complaints from online students about poor audio quality in the classroom were common, suggesting that many online students were forced to rely on the live captions, which can contain significant errors.

Some academics were concerned that students could easily get distracted when joining online,

> *"Students who are prone to zoning out are better-off in the classroom but more likely to choose online given the option. Trying to get them to participate takes energy and attention away from the students in the classroom, and you start to lose them" (Ac, ID:3)*

The majority of academic respondents reported that most or all of their online students did not turn their cameras on or take opportunities, when given, to use the microphone. This further entrenched a sense of disconnect between the two groups, with the academics feeling unsure how to gauge engagement among the online students. As noted by one academic,

> *"I was talking to a black screen and trying at the same time to engage with the students who were in the room. I, as a teacher, felt quite lost in that, even though I tried to imagine that I was doing a TV show kind of thing and just went for it anyway, but inside I felt the lack of contact affected me emotionally" (Ac, ID:23)*

This sense of frustration was a typical feature of many of the academics' descriptions of hybrid teaching, as they felt unsure how to engage the online students in the absence of any visual clues, which exacerbated their concerns about the quality of the learning experience for the remote learners. In an effort to mitigate the potentially alienating effects of hybrid teaching for online students, some academics offered additional online-only sessions for the remote students, or they invited their online students to arrive early or stay online after the end of a session - but this was only possible in cases where lecturers had access to the room at those times (which was rare). Where lecture recordings had failed, some academics reported taking the time to re-record the session in their own time later. While these extra efforts by academics contributed towards greater

inclusivity for students, they often added substantially to the academic's workload and were not seen as sustainable.

Considering all the above points, the potential for hybrid teaching to increase inequality within the student body was seen as real, and several academics warned that universities need to carefully consider their policies and strategies for hybrid teaching if this mode of delivery is to be used in future.

4.2.4 Maintaining teaching quality requires sound infrastructure and ongoing technical support

The evidence from academics in the study shows that hybrid teaching is stressful (and often extremely so) for academics, and that their need for assistance in using available technologies far outweighed the IT/AV support available. To start with, almost all academics found it difficult to set up the equipment for hybrid teaching in the ten minutes allocated before classes. One academic described it thus,

> *"There's always someone teaching in the class before me so I can't get in until ten minutes before and sometimes they take a bit of time to get out and then there is such a lengthy procedure setting it up; you've got to log into the VLE as one person, set up a Zoom call then log into the Zoom call as a guest and then check that the recording is on, check that the closed captioning is on, and all of that, while you're surrounded by students asking you questions about the assignment. And all that with my glasses steaming up [because of] the mask. Trying to make sure it works - it's just impossible to do that in ten minutes" (Ac, ID:29)*

After completing the initial setup, academics needed to manage the technology for sharing content and ensuring that all students could see and hear the lecturer (before even considering inter-group interaction). Problems related to audio were raised frequently: online students reported problems with ambient noise in the room, or being unable to hear when students in the room were speaking. One academic said:

> *"The sound quality for the distance students is terrible. They can't hear well at all and they have all complained because they can't follow the class." (Ac, ID:19)*

Lectures were also sometimes interrupted by audio feedback and echoes when someone in the room joined the online meeting without first muting their device's microphone and speaker.

There were issues with managing the online chat. Some academics found that they could not enable the chat function from the lectern PC and they had to bring another device into the room, which added to the complexity of the experience. In some cases, only the lecturer could see the chat and had to read out the questions to students in the room. Some reported that conducting questions and answers via the chat was painfully slow.

Academics expressed their concern about letting students down when the technology fails, and some said they had apologised to students for situations where a hybrid teaching session had not gone according to plan. Academics said they needed to have the knowledge and confidence to trouble-shoot in the event of technology failure, and they needed a back-up plan for keeping the class running if they had to wait for a technician to arrive; some reported developing such skills and confidence as they gained familiarity with the technology, but most wanted much closer support from IT/AV staff. Some academics requested their IT/AV colleagues to sit in on hybrid teaching sessions so that they could fully understand the nature of the technological challenges. It is noteworthy that this desire for support was expressed by academics who had attended the

institutional training sessions, including some who had been involved in early piloting of the hybrid teaching equipment. Several academics commented on the helpfulness of the IT/AV staff in responding to calls for help and expressed a wish for the hybrid teaching infrastructure to be made simpler to manage and more reliable. This final point cannot be overemphasised, as it arose in the vast majority of responses from academics across both institutions and was almost always expressed as the greatest priority for making the hybrid teaching endeavour successful.

4.2.5 New pedagogical approaches are needed to foster student engagement in hybrid teaching

Some academics realised the need to reconsider their entire module design in light of the move towards hybrid teaching, with several commenting on the importance of ensuring that their module site on the virtual learning environment (VLE) was fully resourced from the start of term, simple to navigate, and contains a "learning roadmap" that students could follow independently if necessary.

One academic reflected,

> *"Hybrid teaching works well when linked to asynchronous and synchronous activities where the content is delivered more like a flipped classroom. Students could self-assess, I could assess, and engagement was excellent" (Ac, ID:9)*

Where academics paid attention to the consistency and completeness of their module sites on the VLE, they were better able to respond appropriately in the event of technology failure in the classroom, as they could instruct the online students to work through the resources on the VLE on their own. This also provided a good solution for cases where remote students had connectivity problems or audio issues with their own devices.

A major challenge for many academics in delivering hybrid teaching was the requirement to split their attention between the face-to-face and online students. Furthermore, in hybrid mode, interaction between the face-to-face students and online students was often limited or non-existent. This was partly because the two groups of students could not always see each other, as some teaching rooms were not equipped with cameras allowing a view of the physical room to be shared with online students, and rooms did not always have screens to display the online student camera views; also, even where this facility was available, most online students kept their cameras off, resulting in a totally black screen. One academic said:

> *"There was a disconnect between those in the room and those online. I tried to encourage connections using breakout rooms containing those in room and those online, but students tended to prioritise one over other, i.e., those in room chatted to others in room and it was only through my facilitation that folks online were included" (Ac, ID:9)*

Some academics invited the online students to post questions and comments in the Zoom/Teams chat, and had pre-arranged times during the lecture when they would stop to read the chat. Some used the chat function to overcome the divide between online and face-to-face students by encouraging the face-to-face students to join the online session from the physical room, using their own devices. In one such case, the academic described his teaching approach as "co-creating" the lecture with the students. He explained it as follows:

> *"What I was having is 300 or 400 [chat messages] per session and how the teaching is then constructed is that you've got the material and the key recordings on [the VLE], and what you're then doing is developing a discussion around the concerns of the students from the*

chat. So ... all the time I would be stopping and saying, 'Look, the chat's gone quiet. Where is everybody? Is everybody there or are you asleep? I need some active chat!" (Ac, ID:32)

However, some academics said their online students posted to the chat only rarely, if at all, despite encouragement to do so. Some lecturers found the chat too distracting and turned it off completely, opting instead to ask students to "shout out" (either in-class or by turning on their microphones) if they had any questions, while others found that the use of tools which are mobile-friendly and unconnected to the institutional platforms (such as Padlet, Mentimeter and Slido) worked better for sharing across both groups. The essential message from the academics was that there was a great deal to think about when designing for hybrid teaching, and that old ways of teaching – particularly in relation to student interaction – did not translate well to the hybrid mode.

A small number of academics attempted to run group work activities in class. In one case, a Teaching Assistant was available to monitor the Zoom groups; in another case, students in the classroom were able to move into physical breakout rooms so that they could be grouped with online students. It was noted that online students may need more support for group work, that academics need to have a plan for whether and how to monitor breakout groups, and that audio issues can affect the success of group work.

Underlining the need for academics to be alert at all times while conducting hybrid teaching, at least three occasions of deliberate interference (or "Zoom-bombing") were reported, one in which a participant (assumed to be a student or someone in the student's environment) disrupted the class by writing rude comments in the chat, and the other in which loud shouting was heard down the microphone. In both cases, the academics acted quickly to mute or remove the participant.
All the challenges and anecdotes noted above illustrate a need for new pedagogical approaches in the context of hybrid teaching. Many academics also emphasised the benefits of having a teaching assistant, either in the room on online, to support hybrid teaching delivery.

4.3 IT/AV Staff

The third stakeholder group considered in this project is constituted by members of staff of the IT/AV technical teams of both participating institutions. The data relevant to this group was obtained through focus group interviews which involved 7 technical staff involved in supporting, developing and installing the IT/AV facilities from the University of Nottingham and 2 from the University of Birmingham (see section 3). The questions asked in the focus group interviews are presented in the Appendix D of this report.

In both institutions, the starting point was to build a hybrid set up on top of existing technology and equipment: at the University of Nottingham, the cameras and microphones used with Echo360 (lecture capture system) were reused, and MS Teams was installed in every teaching room, using existing hardware (IT/AV, ID:7); at the University of Birmingham, additional microphones, cameras and Zoom room control systems were added to the existing setup in large lecture theatres, and integrated camera / microphone / sound bars added to the small teaching rooms (IT/AV, ID:1).

With this in mind, the remainder of this section outlines four priority themes that have emerged from the IT/AV staff focus group interviews. These are:

- Room equipment
- Technology and its use by the academics
- Need for more communication between academics and IT/AV staff
- Future requirements

4.3.1 Room equipment

From a technical point of view the challenges of hybrid teaching relate simply to the equipment inside the teaching rooms, but even before this, IT/AV staff had to design the installation of equipment to meet the needs of hybrid teaching,

> *"the first thing is establishing what hybrid means from a technical point of view" (IT/AV, ID:5)*
> *"As far as we could tell, it hadn't really been done before. So we had to think a bit outside of the box. We used a zoom room system that's generally used for meeting room spaces. And we thought out of the box and modified it and got it to work in a lecture theatre. Came up with some ideas, some designs utilising existing audiovisual systems within the rooms." (IT/AV, ID:8)*

> *"In an ideal world, it would be to given lots of notice. So we had enough time to design it, to order the equipment and to make sure things arrived on time and get it installed." (IT/AV, ID:8)*

The at times outdated standard of the existing teaching rooms could be problematic when trying to install new technology. Lecture theatres were not designed for hybrid teaching equipment; some were not even designed for lecture capture (IT/AV, ID:7). It meant putting new technology into very ageing rooms (IT/AV, ID:7).

Frequently the equipment selected therefore was dictated by existing infrastructure, it was essential that equipment could interface with the existing systems,

> *"[t]hink a great tool there was Microsoft Teams itself in smaller rooms…I know it's not a hardware device but a software solution, but it integrates with the rest of the Universities platforms smoothly" (IT/AV, ID:4)*

> *"the network is always a strong point over the whole of the campus." (IT/AV, ID:3)*
> *"I mean, getting the two things to talk to each other is difficult on our network at the moment" (IT/AV, ID:9)*

Furthermore, limitations were identified in relation to the network; at times of high demand for IT/AV staff skills and services challenges around staffing for managing the network arose (IT/AV, ID:7). In addition, there were limitations in terms of what hybrid systems could be installed because of legacy university network configuration – it would cost *"hundreds of millions of pounds"* to upgrade (IT/AV, ID:8).

Moreover, some of the new equipment caused unexpected issues,

> *"We've had other issues with having to put so much equipment into racks that the racks overheated…causing issues with video dropouts and things like that. If we had to do it again we would build a simpler, more effective system from scratch. And a lot of the equipment we use in a standard room we wouldn't use any more." (IT/AV, ID:9)*

> *Vandalism of cameras… We find it happens quite a lot because the camera, if you walk to the back of the room, you can just grab the camera. It's about that height. So you just grab hold of it and turn it around." (IT/AV, ID:9)*

Ensuring a close-up picture for online participants was seen as important, however camera tracking did not work as intended because of acoustics in the room which 'confused' the cameras,

“I think in most rooms we've effectively disabled the tracker and pull the camera back. So it's as wide angle as we can manage with the camera that's there. In a couple of rooms we have actually put in wide angle cameras now. And the plan is to replace some of the others with wide angle cameras as well so that you see everybody, but obviously you're seeing everybody in one go rather than it being close up on their face. (IT/AV, ID:8 & ID:9)

It was also highlighted that inconsistencies in the teaching and learning experience (IT/AV, ID:7) was caused by the difficulties incurred by the IT/AV staff in accessing teaching rooms to upgrade the equipment due to heavy timetabling.

Last but not least, two further issues emerged from the IT/AV responses.

The first one is timing and related delays. Meetings for university budget decisions could mean long delays in getting budgets approved (IT/AV, ID:7). Similarly, issues in global supply of electronics also added to delays in equipping rooms,

“we're all facing a global chip shortage, lead times and equipment” (IT/AV, ID:5, ID:8)

The second one, is concerned with the budget and commitment to invest:

"we need investment and we need buy-in from the people that hold the purse strings to realise how important this is. And if we don't get it right, the students are going to suffer. And I think that kind of slightly gets overlooked when you give them the budget." (IT/AV, ID:5)

4.3.2 Technology and its use

The IT/AV staff responses reveal difficulties in providing staff training, familiarisation with the equipment and support,

“It felt quite anxiety provoking when I was doing the familiarisation sessions as there was so much they had to remember… And this seemed a lot more complicated to, a lot more things you have to remember to do.” (IT/AV, ID:8)

"Getting people to know how to use the technology to do what they want is always a bit of a problem because they want to be able to just walk in and it just magically happen, not have to think about adjusting settings on Teams and things like that." (IT/AV, ID:5)

In both institutions it seemed that some academics were unaware of the range of equipment available in their lecture theatres and did not use the available equipment to its fullest extent; some academics asked to be timetabled in rooms without hybrid facilities, just because the setup in the room was familiar to them, even though they would have had a better experience in a designated hybrid room.

At the same time, it was felt that academic staff did not all take up the opportunities for training,

"When we're on about training people, we need them to want to be trained and want to learn because, you know, we know in September people are going to come back and they aren't going to have even been in the teaching room since June. And I haven't got time for that. You know, it should it be built into part of their Job description that they have to spend so much time each year learning new teaching

technologies so that everyone can advance forward but they just don't want to." (IT/AV, ID:5)

Another challenge was posited by the fact that multiple staff used the teaching rooms,

> *“When we're dealing with an estate of 350 plus rooms (as is with same with any technology, certainly audio visual) you have to try to cater for such a wide audience all with different needs.” (IT/AV, ID:5)*

> *“And then we find they've added equipment to it without asking us. And to be honest, we can't really help them because it's not a hybrid space. It wasn't designed for that in the first place. So we're not surprised, you know, they're having problems.” (IT/AV, ID:9)*

Hence, academic staff need to be trained on how to adjust settings and amend teaching techniques for hybrid teaching to suit their requirements,

> *"to move forward with hybrid teaching we need to have workshops and teaching of teachers. What to pay attention to, what to be aware of… no one's going to run around with the roving mic all day long for various teaching sessions. And unless you get student helpers doing that. But so just to be aware and getting that experience and the first couple of years will be really horrible" (IT/AV, ID:4)*

4.3.3 Need for more communication between academics and IT/AV staff

Lack of communication between academic staff and IT/AV colleagues was regarded by the latter as a hindering factor, especially since IT/AV staff did not experience what actually happened in the classroom (IT/AV, ID:4; Ac, ID:9) making it more difficult to see how to provide technical support.

That said, problem-solving got slightly easier when using remote support for the Hybrid rooms, so the IT/AV staff could see what was happening on the Zoom panel without going into the room.

> *“Most of the equipment is now remotely accessible…from the office. So we could take complete control of the lecture theatre, fire up the projectors, get it into the right mode, start the call. Share your contents. Everything from here. The [IT/AV] agents will talk the person through it, they won't just do it for them. They will actually talk them through what they're doing. So hopefully next time they come to do it, they're able to do it themselves.” (IT/AV, ID:9)*

Finally, communication and transparency were also mentioned at university level as there seemed to be difficulties in establishing expectations and agreeing on what was needed,

> *"[to] define understanding of what hybrid is and what it means to everybody is the huge challenge because it seems to be different. Whoever you talk to, everybody wants different things." (IT/AV, ID:7)*

4.3.4 Future possibilities

Generally speaking the responses of the IT/AV staff reveal a sense of progress and appetite for potential development in hybrid teaching,

> *"This is gonna be the future in case anything happens like before." (IT/AV, ;[ID:5)*

> *“There's another level we can take it to and we're not there yet. And so I think, I think we're on a journey and it's an upward journey with our collective knowledge. Yeah, I feel like at the*

moment I'm in that place where I take a step forward that it's two steps back because there's more elements, the more we achieve, the more we want." (IT/AV, ID:1)

"I think this has been like a great… it's another income stream. We can now have more and more remote learners." (IT/AV, ID:5)

"Even if we have all students in the room, the opportunity to have guest speakers from all over the world is something that people are now starting to really embrace. Geography is not a barrier to who you can invite to address your students." (IT/AV, ID:1)

But not without questions:

"User training, familiarization with the technology, how do we put the new technology in getting that user training to the users, making sure they know, they are fluent in how the technology is actually used?" (IT/AV, ID:7)

5. Conclusion

Many of the findings from this study align well with earlier findings from the QAA's 2022 *Made Digital* study. From the students' perspective, the study confirms the importance of synchronous student-staff interaction (whether face-to-face or online) for student motivation; the importance of flexibility and choice for students; the value attributed by students to having access to live transcripts and session recordings; the generally positive impact on student engagement when academics make learning resources available and easily navigable in the virtual learning environment from the start of the course; and the need for students to receive clear guidance and support for their participation in hybrid sessions, whether in terms of contributing to the online chat or working in breakout groups.

From a staff perspective, the study has confirmed findings from the QAA's *Made Digital* report in terms of the need for academics to adjust to teaching two groups simultaneously, with particular difficulties faced in gauging engagement when online students keep their cameras off and do not participate in the chat. It has added greater insights around the feeling of stress experienced by academics in having to manage technology which does not always work as designed, or which is complicated and time-consuming to set up. The findings further emphasise the importance of academics being well prepared for hybrid teaching and having a plan B in case of technology failure, and highlight the need for development of new pedagogical approaches to make hybrid teaching more inclusive and engaging for both online and the face-to-face students.

From a strategic point of view, the study has confirmed the need to have measures in place to mitigate potential disadvantages to students from poorer socioeconomic backgrounds; the need for institutional commitment to maintaining and upgrading hybrid teaching equipment to ensure it works reliably, and the related need for hybrid teaching technologies to be straightforward for teachers to manage; it has emphasised the call from academics for more comprehensive support for both the pedagogical and technological aspects of hybrid teaching; and reiterated the concern that hybrid teaching adds an extra burden to the cognitive load and workload of academics.

From an IT/AV staff perspective, this study highlights the significance of keeping technical and pedagogical considerations under the same headings. In particular, both technology and pedagogy need revisiting in synergy for hybrid teaching to happen effectively. The IT/AV participants identified the need for investment in transforming rather than simply adapting classroom equipment and

recognised the need for providing targeted support to academic staff to change the way they teach, ensuring that all students are included and catered for.

In spite of the technical challenges mainly related to teaching rooms' audio configurations, the IT/AV staff came to the fore with a positive attitude towards hybrid teaching, recognising that not only a bespoke upgrade of room equipment, but also improved communication and collaboration with academic staff, and more transparent expectations for hybrid teaching from the institutions would help open new doors of opportunities.

In general, all findings point to a clear need for collaborative partnerships between IT/AV teams, digital learning support teams, academics and students to jointly consider the best possible uses of existing infrastructure and equipment, along with wider issues in the learning ecosystem such as design of module sites in the virtual learning environment, timetabling of classes, and use of teaching assistants to support hybrid teaching.

This section concludes with addressing the research question at the core of this study, and repeated here for convenience:

What pedagogical rationales for and models of hybrid teaching can be identified, to inform the development of inclusive and sustainable education for the future?

Beginning with delivery models of hybrid teaching, the current study did not reveal a great variety in the practice. Even though the partner institutions involved in this study approached hybrid teaching in different ways, i.e. as an optional and as a compulsory emergency solution at the University of Nottingham and at the University of Birmingham respectively, the model adopted for combining online and in-person teaching was substantially the same; that is, the majority of lectures were delivered asynchronously via pre-recorded content, while, if and when allowed by governmental Covid-19 health directives, small group teaching took place in-person allowing students unable to come to campus to participate remotely. Efforts were put in place to engage the online cohort as much as possible with the help of participatory technologies, i.e. polls, collaborative online boards, etc., aiming to offer a comparable learning experience to all students regardless of their mode of attendance.

However, in both institutions the focus of hybrid delivery remained confined to the delivery of individual sessions rather than extended to a more holistic design and practice of entire courses or programmes. In other words, at the time of this study, the two participants institutions had regarded hybrid teaching solely as an adaptive response to the pandemic rather than as an educational model in its own right.

By contrast, this study has proven effective in identifying a variety of strong reasons for engaging in hybrid teaching.

The students' voice surfaced in favour of hybrid teaching as an opportunity to offer flexible education; the ability to choose how to attend teaching sessions scored high amongst the advantages of hybrid teaching – choice increases satisfaction (Blankson et al., 2014), fosters ownership of learning and builds learner autonomy (Nunan, 1997). Alongside choice, convenience came to the fore, especially in relation to travel to and from campus and improved time management, which leads to personalised schedule and increased productivity.

Furthermore, this study provides evidence that hybrid teaching offers opportunity to develop inclusive education; inclusivity, which emerges as the strongest rationale for hybrid teaching both

from the students and the staff perspectives, is intended in its broader sense, i.e. catering for students with diverse personal-life related circumstances such as caring for others, commuting, visa requirements, and so forth, as well as in terms of accessibility, i.e. enabling and facilitating the participation of neurodiverse students as well as those with a variety of health issues such as physical disabilities, mental health and anxiety. In addition, live captions, transcripts and the ability to control lecture recordings all arose as prominent inclusivity themes deriving from the online side of hybrid teaching.

Further sets of reasons endorsing hybrid teaching pertain to the staff perspective; hybrid teaching can have positive impact on student behaviour, i.e. increased attendance due to flexibility, increased participation via the chat functionality, increased in-advance preparation due to access to the asynchronous content that tends to accompany hybrid sessions.

Finally, from a purely pedagogical stand, hybrid teaching is regarded as providing opportunities for a new culture of *networked learning* (Nørgård et al. 2019), which promotes knowledge exchange across geographical boundaries by bringing in expertise from outside the institution, e.g. via guest speakers, and connecting learners from all over the world.

5.1 Future research

Alongside providing answers to and deepen our insight into hybrid teaching and learning, this study also raised several questions that are presented here as potential areas for future research. These are:

- Investigate further the relation between students' difficulties in accessing hybrid teaching sessions and digital poverty. A concern was raised by the academic staff that hybrid teaching may accentuate differences amongst students in terms of access to adequate internet connections, to adequate equipment as well as to adequate study spaces. Thus, more research is needed to understand what devices students are using and what their study environments are like, to ensure that no students are excluded or disadvantaged through hybrid teaching.
- Gain deeper insight with regard to the choice of mode of attendance, especially if transitioning from hybrid to hyflex teaching.
- Investigate a potential relationship between student experience of hybrid teaching and technical set up and or institutional approach.
- Examine the relationship between student experience of hybrid teaching and staff digital skills and staff pedagogical understanding of the practice.
- Investigate further the impact of different teaching contexts, e.g. large vs. small groups, on the experience of hybrid teaching.
- Investigate how students with anxieties experience hybrid teaching.
- Investigate effective techniques for developing a sense of community in hybrid teaching.
- Evaluate whether hybrid teaching may be better suited to some cohorts than other, e.g. for mature learners vs. undergraduate students.

5.2 The sustainability of hybrid teaching and learning

Within the Universities of Birmingham and Nottingham, the findings from the surveys and focus groups reveal that there are widespread concerns among staff about sustainability of the hybrid teaching practice. Teaching staff noted that the practice added substantially to the academic's workload and were worried that this would not be recognised in their workload allocation. IT/AV staff identified additional issues in relation to inadequate network infrastructure, equipment, and support structures which could threaten the sustainability of hybrid teaching practices if not addressed through additional financial investment.

In this scenario, the widespread temptation to want to return to pre-Covid19 practice does not come as a surprise, even though, as mentioned earlier, it is unrealistic for universities to do so. In addition, building on Nørgård et al.'s (2019) broader concept of hybridity, defined as "a system for bringing different discourses and formats in contact with one another that aims to invigorate one format by mixing it with another" (ibid: 76), it seems more aligned with post-pandemic education to start looking at hybrid teaching as the vehicle that facilitates the creation of "a networked university in which learners inside and outside the classroom and campus get entangled in joint dialogues, collaborations, and communities. As the [networked] university enters into dialogue with society, its teachers enter into collaboration with students, and the onsite classroom enters into dialogue with online research communities. In this way, the possibility for other forms of professional academic development and networked learning comes to the fore." (ibid: 76-77).

Nevertheless, it must be understood that adopting hybrid teaching and learning is not a quick win. In addition to infrastructure investment, almost all staff who took part in this study recommended that an additional person should be present in the teaching session to ensure that all students are heard and able to contribute, regardless of their location, increasing the cost of teaching resources. Also, as previously found by the QAA and published in the *Made Digital* report, investment is needed to support staff development "it is important that providers are aware of staff's digital capabilities and offer support where necessary." (QAA 2021: 7).

In this climate, University leadership now needs to steer the direction that hybrid teaching should take at their institutions and carefully consider policy development to address to whom the hybrid option should be offered and what steps must be taken to ensure institutional readiness. With proper investment, university leaders could embrace the opportunities that hybrid practice offers, which could lead to positive reputational returns due to the potential to widen participation in Education, as well as financial returns due to a corresponding increase in student applications.

Finally, addressing the alternate meaning of sustainability, students were also able to travel less because of being able to study remotely. The possibilities that this removal of the dependence on location enables were mentioned often by the participants of this study.

The potential to design programmes that utilise hybrid teaching as a strength appears as yet untapped, though emerging practice has been described in this report.

5.3 Recommendations

The aim of this section is to present a set of recommendations generated through this study to inform the future implementation of hybrid teaching.

5.3.1 Staff training

Develop a comprehensive training programme to ensure the development of the set of pedagogical and digital skills required to achieve successful results.

5.3.2 Hybrid teaching requires more human resources

Provide ideally two members of staff in every hybrid session, to ensure that both groups of students receive adequate attention and to help manage communications if any of the technology fails, and to support the academic who faces very real challenges in teaching two groups of students simultaneously.

5.3.3 More comprehensive pedagogical support

Provide greater pedagogical support from someone with specific hybrid teaching expertise in the context of their disciplines. This type of support should address learning design for hybrid teaching, and any modifications to associated assessment.

5.3.4 Better technology solutions and technical support

Provide adequate technical support in the classroom to lighten the teachers' cognitive load during the session. Additionally, provide simpler, more reliable hybrid teaching technology. Teaching spaces need to be set up appropriately if they are to be used for hybrid teaching. This involves making sure that online students can see into the room, and in-class students can see their remote peers on a screen. Sound quality is paramount and should be prioritised in room maintenance. Where rooms do already have built-in cameras and microphones, these need to work reliably and be simple to operate. Room set-ups need to allow the lecturer to move around; having to be tied to the lectern to remain in view for the online students is seen as problematic, as it is easy to forget this and restricted movement was unnatural to some.

5.3.5 Consultation and considerations

Ensure that decisions about hybrid teaching are not rushed through without proper staff consultation or considerations given to the practical or pedagogical implications of hybrid teaching as compared to teaching face-to-face or purely online, as this may create morale issues for staff where they do not feel adequately supported or heard.

5.3.6 Hybrid teaching policy

Develop a hybrid teaching policy and guidance to ensure that the right student body is targeted. It is possible, for instance that hybrid teaching is better suited to mature, postgraduate learners, with undergraduates likely to see it as not worth the money.

5.3.7 Manage expectations

Engage in raising staff awareness about the possibilities and pitfalls of hybrid teaching and develop a transparent communication strategy to explicate to the students the circumstances in which hybrid teaching takes place.

5.2.8 Communication

Communication and collaboration amongst all stakeholders is paramount to ensure the synergy between the pedagogical development of hybrid teaching and the configuration of the technical infrastructure to support it and the strategic plans to implement it.

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Appendix A: Student Survey

Introduction

The purpose of this project led by University of Nottingham in collaboration with the University of Birmingham, is to learn what works well and what does not work so well in hybrid teaching. By "hybrid teaching", we mean lectures/ seminars/ classes in which some students are physically present in a classroom and others join online from remote locations. The survey will gather student views and experiences that will inform future decisions about the adoption of hybrid teaching and learning in the future.

Data from the surveys will be collected anonymously and only accessed by authorised personnel involved in the project. The information will be retained by the University of Birmingham and University of Nottingham and will only be used for the purpose of this project. By consenting to take part in this project you are consenting to the University storing your information for the purposes stated above. For more information on how the University uses your data, please click https://www.birmingham.ac.uk/privacy/index.aspx for University of Birmingham and https://www.nottingham.ac.uk/utilities/privacy/privacy.aspx for University of Nottingham.

The survey takes less than 15 minutes to complete. Every completed survey will be entered into a prize draw to win a prize of a £50 or a £20 voucher.
For more information please contact:
Principal Investigator, University of Nottingham - Cecilia Goria (email address provided)
School of CLAS Ethic Officer, University of Nottingham - (email address provided)
Head of HEFi Digital, University of Birmingham – Matt Turner (email address provided)

1. I consent to participate in this survey
    - Yes
    - No [If participants selected No, they were branched directly to the "Submit" button, which would close down the survey for them]
2. Did you attend classes in which some students were physically present in a classroom and others joined online from remote locations in the last 18 months?
    - Yes
    - No [If participants selected No, they were branched directly to the "Submit" button, which would close down the survey for them]
3. Which university are you studying at?
    - University of Nottingham
    - University of Birmingham
4. In which College/School/Department are you currently enrolled?
5. What is your level of study in university?
    - Foundation Year
    - Undergraduate
    - Postgraduate
    - Other
6. Gender: How do you identify?
    - Male
    - Female
    - Prefer to self-describe
    - Prefer not to answer

- Other

7. Choose one option that best describes your ethnic group or background
    - White
    - Mixed/Multiple ethnic groups
    - Asian/Asian British
    - Black/African/Caribbean/Black British
    - Prefer not to answer
8. Age
    - Under 18
    - 18-24
    - 25-34
    - 35-44
    - 45-54
    - 55-64
    - 65 and over
    - Prefer not to answer
9. Did you attend only online, in the classroom, or a mix of both?
    - Only online
    - Only in the classroom
    - At different times online and in the classroom
    - A mix of both (e.g. using a device in the classroom to connect to the online session)
10. Please tell us a little more about this.
11. What was the main advantage you found when participating in Hybrid teaching sessions?
12. What was the main challenge you faced when participating in Hybrid teaching sessions?
13. I had access to an appropriate device to participate in the Hybrid teaching sessions online
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
14. I had a study space where I could attend Hybrid teaching sessions online
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
15. My internet quality (connectivity, speed, etc.) was sufficient for Hybrid teaching sessions
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
16. During my Hybrid teaching sessions, I had communication problems with sound (bad sound quality, could not hear the lecturer or the other students in the classroom or online)
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
17. I had the necessary IT skills to take part in the Hybrid teaching sessions.
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
18. The teacher was proficient/familiar with the Hybrid teaching technology
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
19. Time was wasted in Hybrid teaching sessions because the activities took longer than usual.
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
20. Collaboration between face-to-face and online students was easy in Hybrid teaching sessions
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
21. Hybrid teaching sessions allowed me to attend classes that I would have missed otherwise
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
22. Hybrid teaching sessions caused me some anxiety
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
23. Whether attending online or in the classroom, all students were treated fairly and equitably
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable

24. During the Hybrid teaching sessions, I was aware of the help available to support me
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
25. The Hybrid format allowed me to choose my learning environment
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
26. The Hybrid format makes learning more interesting
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree/ Not applicable
27. Please rank the following three ways of participating in lectures/ seminars/ classes in order of preference from 1-3, where 1 is your most preferred kind, and 3 is your least preferred.
    - All students face-to-face
    - All students online
    - Hybrid teaching session
28. Please give a reason for your answer above.
29. If in future you have a module where the lectures/ seminars/ classes are taught in hybrid format, and you are given the choice of how to participate, which one would you choose
    - Face-to-face
    - Online
    - Sometimes face-to-face and sometimes online
30. Please give a reason for your answer above.
31. Overall, I benefited from the Hybrid teaching session format.
    - Strongly agree/ Agree/ Neutral/ Disagree/ Strongly disagree
32. Please give a reason for your answer above.
33. Please type your student email address here to be entered into the prize draw to win a £50 or a £20 voucher. (optional)

Thank you for taking the time to complete this survey. We truly value the information you have provided. Your responses will contribute to our analyses that will inform future decisions about the adoption of hybrid teaching and learning in the future

With best wishes,
The Research Team

Appendix B: Academic Survey (University of Nottingham)

Introduction

The purpose of this project led by the University of Nottingham in collaboration with the University of Birmingham, is to learn what works well and what does not work so well in Hybrid teaching. By **"Hybrid teaching", we mean lectures/seminars/classes in which some students are physically present in a classroom and others join online from remote locations.**

The survey will gather staff views and experiences that will inform future decisions about the adoption of hybrid teaching and learning. Data from the survey will be collected anonymously and only accessed by authorised personnel involved in the project. The information will be retained by the University of Birmingham and University of Nottingham and will only be used for the purpose of this project. By consenting to take part in this project you are consenting to the University storing your information for the purposes stated above. For more information on how the University uses your data, please click https://www.birmingham.ac.uk/privacy/index.aspx for University of Birmingham and https://www.nottingham.ac.uk/utilities/privacy/privacy.aspx for University of Nottingham.

The survey comprises 24 questions in total and should take approximately 15 minutes to complete.

The survey will remain open till July 20th.

For more information please contact:
Principal Investigator, University of Nottingham - Cecilia Goria - (email address provided)
School of CLAS Ethic Officer, University of Nottingham - (email address provided)
Head of HEFi Digital, University of Birmingham - Matt Turner (email address provided)

1. I consent to participate in this survey
    - Yes
    - No [If participants selected No, they were branched directly to the "Submit" button, which would close down the survey for them]
2. Have you delivered any sessions in hybrid mode (ie with some students in the classroom and others online)?
    - Yes
    - No [If participants selected No, they were branched directly to the "Submit" button, which would close down the survey for them]

(Section 2) Context questions:

3. School/Department (optional):
4. Job title (optional):
    - Teaching Associate
    - Assistant Professor
    - Associate Professor
    - Professor
    - Other:
5. Type of contract (optional; select all that apply)
    - Permanent
    - Fixed-term contract
    - Full-time

- Part-time
- Other:

6. Please tell us the name of the module(s) that you delivered in Hybrid mode.
7. How many students did you have approximately (1) online, and (2) in the room for each Hybrid module? Please say if student numbers (both online and in person) changed significantly from one session to another.
8. In what type of room did you deliver hybrid teaching ?
    - Lecture theatre
    - Seminar room
    - Other:
9. Why did you choose to deliver your teaching in Hybrid mode? Explain briefly (30 words max)
10. Did you use any of the help offered by Learning Technologies or Digital Technology Services to support your Hybrid teaching?
    - Yes/ No
11. Which service did you use?
    - Digital learning Drop-in (Helpers) on Teams
    - Online training courses
    - Other:
12. How did you communicate with the students in the room and online? (select all that apply)
    - Microsoft Teams
    - Echo360
    - Classroom portable microphone
    - Fixed microphone on the lectern
    - Classroom/Lectern webcam
    - With a separate device for students online (eg laptop, tablet or smartphone)
    - Other:
13. How did the online students communicate with you and with students in the room?
14. Could the students in the room see those online and vice-versa?
    - Yes/ No
15. What do you think worked well in your hybrid teaching experience?
16. What were the greatest challenges you experienced when delivering hybrid sessions?
17. How were the challenges that you mentioned in the [previous question solved/addressed?
18. Did you receive any feedback (formal or informal) from your students about their experiences in the Hybrid sessions?
    - Yes/ No
19. If so, could you tell us what the feedback was?
20. What do you think are the benefits of Hybrid teaching, from both the student and the teacher perspectives?
21. In principle, what are the disadvantages inherent in Hybrid teaching, and and how could they be mitigated?
22. To what extent do you regard Hybrid teaching an educational opportunity?
23. What would your recommendations be to University leadership regarding Hybrid teaching in the future?

24. If you are willing to be contacted further on this topic, please write your email here (optional)

Thank you for your response.

Appendix C: Academic Survey (University of Birmingham, 2021)

Introduction

This survey is to help understand the staff experience of teaching in the Hybrid Teaching rooms, so that the university can better support academics who teach in these rooms. The survey should take around 10 minutes to complete.

For more information on the Hybrid Teaching rooms visit the Hybrid room hub: https://bham.sharepoint.com/sites/HybridTeaching

The information that you share will be processed by the Hybrid Teaching room project team, within the University of Birmingham. This information is being collected so as to provide you with support and help staff deliver your educational experience. To find out how we will use any personal data you share with us, please read the UoB privacy statements (https://www.birmingham.ac.uk/privacy/index.aspx).

You can return to the survey and provide additional feedback as many times as you would like. The survey will be open until 10pm Wednesday 27th October 2021.

1. Did you attend a Hybrid familiarisation session before your first Hybrid teaching session? (Yes/No)
2. Please rate the session for how useful it was in helping you prepare for using a Hybrid room.
3. Did you visit the Hybrid Teaching Room Hub website (https://bham.sharepoint.com/sites/HybridTeaching) before your first Hybridteaching session (Yes/No)
4. Please rate the Hybrid Teaching Room Hub website for how useful it was in helpingyou prepare for using a Hybrid room.
5. What module was the teaching session for? Please give the module name andnumber.
6. What type of session did you use the Hybrid teaching room for? For example;interactive lecture, workshop, seminar, examples class
7. Approximately when did your session(s) take place?
8. Did you use a Large Hybrid room (>100 capacity) or a small Hybrid room (<25capacity)
9. Approximately how many students were there in the room?
10. Approximately how many students were there on Zoom?
11. What building(s) and room(s) did your Hybrid Teaching sessions take place in?
12. Please rate the following:
    - Students in the room were able to contribute to the session
    - Students on Zoom were able to contribute to the session
    - I could hear the students on Zoom when I needed to
    - Students could interact with each other when the needed to

13. Please comment briefly on your teaching experience. Any information you can provide about how you encouraged interaction between students, or how youcatered to students in both modes (Zoom and in the room), would help us to enhance the hybrid experience for other academics and students. Please share what worked and what didn't work, and any tips and tricks you think would be of use to others.
14. Did you have an assistant (for example a nominated student or a PGTA)?
15. Did you choose to make use of any of these techniques, approaches or activities? (Yes, with some success/ Yes, but with problems/ No)
    - Breakout rooms
    - Polls (with Zoom)
    - Polls with TurningPoint Web (or another polling tool)

- The chat in Zoom
- Discussion boards in Canvas
- Other web apps (e.g. Padlet, Twitter)

16. If you used other web apps (e.g., Padlet, Twitter), please indicate which ones you used, and say whether you plan to use them again.
17. Would you recommend teaching in a Hybrid Teaching room to your colleagues?
18. Please add any other comments you would like to make.

Appendix D: Focus Group with IT/AV staff (both universities)

1. (Ice breaker) start with a shared definition of hybrid teaching (but don't spend too much time on this). Give the definition ' physical and online students taught simultaneously & synchronously' In one sentence can you describe what your role was in relation to hybrid teaching?
2. What are the IT/AV challenges in implementing hybrid teaching?
3. What strengths (IT/AV) does UoN/UoB have that could help us implement hybrid effectively?
4. What weaknesses (IT/AV) does UoN/UoB have that could stop us implementing hybrid effectively?
5. To what extent can you see a place in UoN/UoB for hybrid teaching in the future?
6. What opportunities and threats might such a development present from your perspective?
7. What approaches to hybrid teaching are you aware of at UoN/UoB- are these institutionally approved/provided or locally attempted?
8. What approaches to hybrid teaching are you aware of at other universities?
9. What has worked well with any existing hybrid teaching set ups that you have been involved in at Uon/UoB?
10. What, if anything, would you do differently next time?
11. What, if anything, do you think the institution needs to do differently next time?

Appendix E: Focus Group with academic staff (University of Birmingham)

1. Context questions:
    a. Please tell us what module(s) you taught in hybrid mode.
    b. What hybrid teaching setup did you use: (i) Large hybrid teaching room, (ii) small hybrid teaching room, or (iii) a room that was not designated for hybrid teaching?
    c. How many students did you usually have (i) online, and (ii) in the room?
    d. Did you have an assistant (e.g., a PG student) to help with hybrid delivery? If so, what was that person's role?

1. Can you describe what happened in a typical hybrid teaching lecture? E.g., Where in the room did you position yourself, and why? How did you share content (e.g., your slides)? How did you communicate with the students in the room and online? How did students in the room and online communicate with you and with each other?
2. Can you describe any highlights of your hybrid teaching experience?
3. Were there any "lowlights" of hybrid teaching for you? Can you describe what happened, and if problems arose, how you (or someone else) solved the problem(s)?
4. Did you receive any student feedback from your students about their experiences in the hybrid teaching sessions, even if only in an informal sense? If so, could you tell us what the feedback was?
5. [Follow-up question if this is not covered in their response:] If you were aware of different views/ experiences from within your student body, could you elaborate on those differences?
6. In principle, assuming we could resolve any technology problems you have described, what do you think are the benefits of hybrid teaching, from both the students' and the academic's perspective? [FG lead to allow as much time as needed for this question, and ask participants to give reasons for their answers, and add anything else they can think of.]
7. In principle, do you think there are any risks inherent in hybrid teaching, and if so, how could we mitigate these risks? [Allow as much time as needed here, as above.]
8. What would your recommendations be to the following groups regarding hybrid teaching in future? [Allow as much time as needed here, as above.]
    e. University leadership
    f. HEFi/ LRAT / professional services staff who support academics in hybrid teaching
    g. Other academics doing hybrid teaching
    h. Students attending hybrid teaching sessions
9. [Backup question in case there is extra time] Are there any other approaches to hybrid teaching that you are aware of (e.g., at other institutions)? If so, what could we learn from these approaches to improve our own hybrid teaching practice?