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An Overview of Student Perceptions of Hybrid Flexible Learning at a London HEI

ARTICLE

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ABSTRACT

Following implementation of a novel Hybrid flexible synchronous teaching approach, research was conducted. This looked at student views and perceptions of the approach both technically and pedagogically. The aim was to gather data to understand the approach from a student perspective and explore what would help ensure they gain the most from their experience in terms of engagement. Focus groups and interviews were held, and coding of data and thematic analysis was conducted. The main findings concerned engagement, equity of experience, and non-standard use issues, as well as benefits around flexibility for students. An original contribution to knowledge in this paper is shown through this being the first example of the thematic analysis of student feedback from hybrid flexible learning in this specific HE context. Limitations of this research include the specific conditions under which the research was conducted during a pandemic as this forced use of online-only recruitment and data gathering.

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INTRODUCTION

DEFINING HYFLEX

While hybrid flexible learning is an emerging field, the views of students are an important consideration for understanding how it can be managed and implemented going forward. Within the literature, we need to be cognisant that the term 'HyFlex' is broad, and while the idea it relates to – hybrid flexible delivery – is specific, the mechanism for that delivery has been applied generally. In this study, we have used the following definition of the term from the literature: 'The hybrid flexible approach of having seminars delivering synchronously face-to-face and on-line' (Sanchez-Pizani et al. 2022). In this case, hybrid refers to both online and on-campus teaching and flexibility refers to student flexibility in choosing between modes. Furthermore, we have used the term hybrid to refer to solely synchronous delivery of face-to-face teaching and asynchronous delivery of online teaching.

Each institution has adopted a different mechanism for delivery, and the mechanism of delivery explored here, using synchronous teaching connected via video screens, is fairly novel. This specific usage was first adopted in the UK in 2020 in the institution this study focuses on. It has now been adopted at a number of institutions both in the UK and elsewhere. The precise number of institutions currently adopting this approach is difficult to ascertain; more than a dozen UK institutions are at various stages of implementation. Internationally, it is being used in the Netherlands, the USA, Malaysia and other institutions are also considering it, so there is a growing international presence (Raes 2021; Shek et al. 2022; Rhoads 2020, Subramaniam et al. 2022). Given the increasing use of this approach, understanding the student experience fully has become critical.

IMPLEMENTATION AND INSTITUTIONAL CONTEXT

The implementation of HyFlex at King's College London began in 2020, and while there isn't an extensive literature on implementation, there have been several previous papers published on this topic. The implementation of the approach used at this institution has been written up by Detyna et al. (2022), and Sanchez-Pizani et al. (2022). The institutional context is important – that of delivery of a novel simultaneous on-campus and online system of teaching where both online and in-room student cohorts synchronously use a combination of Microsoft Teams (MS Teams) software, multiple screen mirroring and in-room microphone and 180-degree camera equipment. This novelty has meant that there is a gap in the literature in terms of the consideration of student perspectives on video-based synchronous HyFlex seminar delivery, which this paper hopes to address.

RATIONALE

This research was conducted to gain an insight into student perceptions of this teaching and technical approach. Our approach was informed to some extent by Dommett (2018), who found that positive engagement with technology is partly based on learner acceptance. The key research questions explored were:

1. What opportunities and challenges did students experience in this approach?
2. How did students learn through HyFlex?
3. What did students feel they gained from their experience?

These questions were informed by the theoretical approach adopted (detailed in the Conceptual Framework section). All questions were further informed by Fredricks, Blumenfeld and Paris's (2004) tripartite suggestions around student engagement levels (cognitive, emotional and behavioral).

LITERATURE REVIEW

The most detailed literature review on the topic, by Raes et al. (2019), found that initial scepticism from both staff and students often led to eventual acceptance of this approach. They caution that, for it to be successful, there needs to be appropriate scaffolding of learning. A study by Abdelmalak and Parra (2016) also emphasised the importance of the following:

accommodating students' needs and their life circumstances; differentiating instruction; increasing student access to course content and instruction; and encouraging student choice and control. A focus on the student experience when looking at student engagement during the pandemic was also recommended by Gourlay et al. (2021). Bozkurt (2022) agreed that further research on the flexibility offered to students by blended learning options was needed. Binnewies and Wang (2019) also found that most students appreciated the HyFlex mode of delivery, although it was somewhat constrained by the technology available. Shek et al. (2022) concurred with this positive view but cautioned that further research was needed using student interviews and focus groups, which they felt would have been useful to complement the survey data they collected and analysed. This research aims to help fill these identified gaps.

STUDENT PREFERENCES FOR HYBRID FLEXIBLE DELIVERY

According to a study by He et al. (2015) (with n = 139 students), students had a general neutral response when choosing between hybrid and online learning. They found that motivation is strongly connected to exam performance and the overall success of the approach depended on student skill level. We should be mindful that this version of hybrid flexible learning did not as default use synchronous learning so as not to over-extrapolate the findings. Malczyk (2019) found that social work students participating in a HyFlex blended course experienced enhanced levels of satisfaction and increased participation with online coursework, while still performing at the same academic level. Malczyk's definition of HyFlex differs slightly from our own, however, in that it combines asynchronous and synchronous teaching. Raes et al. (2020) also found that certain tools – specifically quizzes – could have a positive effect on learner engagement.

PREFERENCES FOR FACE-TO-FACE LEARNING

In the literature, there are examples of negative student perceptions of hybrid approaches compared to face-to-face learning. According to Kohnke and Moorhouse (2021), students perceived that their workloads had increased and agreed that the HyFlex mode was not as effective for teaching compared to in-room only modes. Verrecchia and McGlinchey (2021) also found that student evaluations for the in-room class were slightly higher than the student evaluations for the HyFlex classroom (n = 45).

STUDENT ENGAGEMENT AND MODALITY

Fredricks, Blumenfeld and Paris (2004) define learner engagement as being composed of three parts: behavioral, emotional and cognitive. In this research we will be looking at all three with a focus on cognitive engagement. In terms of other studies looking at engagement, Raes (2021) found that remote and on-site students scored equally on the post-test for conceptual understanding. In addition, her research found on-campus students experienced higher levels of affective engagement. An older study by Driscoll et al. (2012), which predates HyFlex, and looked solely at online versus in-room, found no significant difference in student satisfaction nor exam performances. Building on this, similar research by Rhoads (2020) found no significant difference between course delivery modalities in their impact on final grade average, and non-statistical findings showed a positive relationship between course attendance flexibility and student satisfaction. However, Boylan et al. (2022) noted that 'student engagement' was also specifically highlighted as a key challenge, although a majority (77%) of the students surveyed thought that the academic rigor and quality was still equal to that of in-room delivery. In terms of overall feedback, Archee, Dawkins and Gurney (2021) felt feedback showed HyFlex was only useful in specific circumstances. Shek et al. (2022) also reported very positive student feedback on teaching conducted in the HyFlex method for Law specifically.

TECHNOLOGY USE FOR TEACHING

Technological challenges encountered by online students according to a study by Kohnke and Moorhouse (2021) included a disruption or breakdown in communication during the transition between speakers and difficulty observing paralinguistic cues from audio. Similarly, digital inclusion barriers were highlighted as having a key impact on student engagement by Ulzheimer et al. (2021). Positive use of the technology was observed by Raes (2021), who found that there were higher engagement scores for students turning on their cameras.

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ONLINE LEARNING DURING THE PANDEMIC

It is important to situate this research within the context, namely the COVID-19 pandemic, and to be mindful of the effect this novel learning environment had on students. The literature provides examples of student engagement, frustration and other challenges due to the pandemic, particularly for online learning. A study by Wu and Teets (2021) indicated that 'student engagement decreased in three of the four components during online studies during the pandemic: skills engagement, emotion engagement, and participation engagement'. Similarly, Dahleez et al. (2021) pointed out that the usability challenges of some online systems hampered learner engagement. Hollister et al. (2022) found that 72% of students reported that low engagement hurt their online learning experience; students struggled to stay connected to their peers and instructors and to manage the pace of coursework. Detyna and Koch (2022) also found that staff perceived online students to be less engaged. Furthermore, a recent article by Weissman (2022) discussing national student survey results made the impact of the pandemic clear - students were generally struggling with remote learning. Spitzer et al. (2021) also found that, whereas the total number of students using an online learning environment increased considerably during and after pandemic school closures, students' engagement levels decreased over time.

CONCEPTUAL FRAMEWORK

It was important to understand appropriate conceptual frameworks in order to structure this study. Radcliffe (2008) argues that the introduction of novel technology in a learning space needs to consider three areas: technology, pedagogy and space. When considering pedagogy, the student engagement aspect has been characterised by Fredricks, Blumenfeld and Paris (2004) as consisting of behavioural, emotional and cognitive engagement. We should also consider the TPACK structure of Mishra and Koehler (2006), who argue that appropriate teaching occurs when the lecturer and host institution have the required technology, pedagogy and content knowledge. As regards technology, we should also be cognisant of the work of Venkatesh and Davis (2000) on technological acceptance, particularly on perceived ease of use. We have used these conceptual frameworks when analysing the data.

METHODOLOGY

PARTICIPANTS

Students (total n = 40) from foundation, undergraduate and postgraduate teaching groups in a range of faculties were interviewed (see Table 1). All participants were volunteers recruited via faculty professional teams and an internal study volunteer circular. Ethical approval was obtained and granted under MRA-20/21-23205. All participants were provided with participant information sheets and gave written consent to participate. They were incentivised with a voucher sent post-event. A full breakdown of all participants by discipline and level is shown in Table 1:

	NUMBER OF STUDENTS (%)
Level of study:	
Foundation	2 (5)
Undergraduate	18 (45)
Postgraduate	20 (20)
Discipline of study (for undergraduate and postgraduate only)	
Arts and humanities	9 (22.5)
Social science	7 (17.5)
Psychology and neuroscience	9 (22.5)
Law	5 (12.5)
Life science and medicine	6 (15)
General academic foundation year	2 (5)
Natural and mathematics science	1 (2.5)
Business and economics	1 (2.5)

Table 1 Breakdown of participants by discipline and level.

DATA COLLECTION AND ANALYSIS

Data was collected through focus groups or interviews based on student preference for one or the other. All focus groups and interviews were held in the same term concurrently. Four focus groups with 33 participants and seven individual interviews were held.

Participants were interviewed via video chat for interviews lasting approximately 60 minutes on average. They were asked to describe their first experience with HyFlex, how they prepared, as well as any changes between their first HyFlex class and their most recent one. Students were asked to consider how online HyFlex compares with on-campus; and also to compare it with studying fully online during the pandemic. They were asked to consider what went most right, and what was their worst experience, and to provide suggestions on how to improve HyFlex from the student perspective.

The rationale for interviews and focus groups was to allow for more in-depth conversations and semi-structured responses. It was decided that participants would be freer to speak, as DeJonckheere and Vaughn (2019) argued, noting that interviews allow subjects to 'explore participant thoughts, feelings'. We felt that focus groups would allow consideration of the context in which communication occurred, and encourage the sharing of socially shared and socially contested understandings (Flick & Foster 2017). Additionally, allowing students the option to choose to attend these or one-to-one interviews ensured inclusivity. Coding was agreed by all researchers, and inter-rater reliability was based on the approach in Garrison et al. (2006). Analysis of the focus group and interview texts used the thematic analysis technique outlined by Clarke and Braun (2014), and the coding theme identification and reporting approach was informed by that of Cohen, Manion and Morrison (2017) to ensure it was robust. To some extent, codes were informed by theory, in particular Radcliffe (2008), which stresses the importance of pedagogy, space and technology, but the majority of codes were developed inductively from the data post-event. The methodology was also influenced by the research of Ouimet et al. (2004) who noted the importance of using focus groups and interviews to ensure student feedback was reliably recorded.

Inter-rater reliability was checked via the simultaneous coding of a student interview transcript by two researchers and then percentage comparison of common node use in NVivo, this resulting in a 90.91% similarity finding to confirm research team agreement of node understanding (*see* Appendix 1). In general, there was good agreement between the two researchers, hence the high similarity rating, one example's placement under a different theme being the main exception. Therefore, considering research by O'Connor and Joffe (2020) on inter-rater reliability, it was decided that this was a reasonable metric of reliability.

RESULTS AND MAJOR THEMES

There were a number of themes, including these 7 key themes identified across the 11 interviews and focus groups by our analysis.

1. DIFFERENCES IN STUDENT INTRODUCTION TO HYFLEX

Faculties and staff used different methods of informing students about HyFlex, however, some were not sent any prior information at all.

Students therefore suggested introducing a 'getting to know HyFlex' session. Students reported being appreciative of some staff introducing students to HyFlex at the start of the first session:

> *"I think the format worked well where people were aware that HyFlex is going to be part of the teaching. So, where they were told in advance about how that would work, and it was ensured that students in the class were aware that there are some people online and that that was OK…"*

Students suggested expectation-setting and "norms expected" in a HyFlex class be part of introductions to every HyFlex session to remind students about the need to include the other cohort and be patient with the set-up during the first sessions.

2. ENGAGEMENT OF STUDENTS ONLINE

Online students were often reluctant to participate when there were fewer online students; they acted like 'spectators' watching a recording, and this was disappointing for in-room students and staff members:

> *"I could see that they don't participate, they are usually very hesitant to turn their cameras on [...] if you turn your camera on when you're online, everyone sees your face and your face is literally on a massive screen."*

Student participation online often depended upon student confidence:

> *"I'm a mature student, and so if I wanted to say something, I would just kind of interrupt in the way that the staff expect from a seminar. I have the self-confidence to do that interrupting. [...] I think they probably need to invite interjections rather more."*

Students reported that online attendance greatly decreased over time for several courses. Some online students felt in-room students ignored them to a greater extent compared to when all were attending entirely in-room or online. Hand-raising and reactions emoji use on MS Teams by online students were not always noticed by staff.

They suggested that staff be asked to amend class activities to involve online students to a greater extent. Having assignments based on class content determine part of the grade was also suggested by students to encourage greater online student engagement.

Graduate teaching assistant extra support in-room was greatly appreciated by online students; they could message directly to ask them to repeat what was said by in-room students and have their MS Teams chat questions pointed out quickly to those in-room.

Online students appreciated staff specifically addressing them during class:

> *"And the staff were good at remembering to, if they were asking questions to the room, go, "Is there anything from people online at home?". So, they were good at not just ignoring the people that were joining online on HyFlex."*

Staff asking those in-room to join MS Teams calls so they could see the chat and reaction use directly was also helpful.

In terms of technological solutions, students suggested lavalier microphones be used to improve audio volume changes for those online when staff had a habit of moving around the classroom.

STEM students also suggested that the location of cameras and microphones be changed in rectangular rooms in order to ensure greater visibility, especially when an in-room whiteboard was being used. Other related themes included the conduct of students, with some students online blaming those on campus for not interacting fully, and vice versa.

3. DIFFERENCES IN STUDENT EXPERIENCE BETWEEN ONLINE AND IN-ROOM ATTENDANCE

In-room students reported that their in-room experience was not so different to traditional in-room teaching. Students expressed that they preferred fully in-room, then fully online, then in-room HyFlex, then online HyFlex attendance, in that order:

> *"I'd say the main thing for me is being able to stay engaged in the class. Being in person, you don't really have things distracting you and you're there and there are the teachers in front of you."*

Language students, who needed to practice speaking as part of their language practical sessions in class, preferred in-room or HyFlex in-room attendance for better communication.

Staff were using MS Teams interactive functions such as polls, chat etc. less than in online-only seminars, and this was disappointing to some students:

> *"When we had polls, we just had a code that we would enter in on a website. So, the people online and the people who were attending in-person could take part."*

4. HYFLEX FLEXIBILITY AND ADVANTAGES OF ATTENDING ONLINE

Students appreciated the flexibility of HyFlex, especially when mode attendance was left to student choice on the day and students did not need to inform staff in advance:

> *"I felt like, in the current year, it was important to have that option, and so I appreciated the flexibility. And going into it, I wasn't sure how much I would be in-person or how much I'd be online."*

Working and part-time students also appreciated the flexibility advantages of HyFlex attendance online:

> *"As a medical student, with just having a lot of contact hours and having to just fit a lot of things into my day, having that option of being able to tune in remotely was quite a nice thing."*

Students appreciated that HyFlex allowed classes not to be cancelled completely if staff or students were suddenly unable to attend in-room due to student illness or transport strike action. Students also expressed gratefulness for HyFlex because of longer-term health issues such as injury and disability, 15% of students mentioning that they would not have been able to attend courses otherwise:

> *"I used HyFlex extensively in the first semester because I was injured and couldn't travel."*

> *"Had it not been HyFlex, then I would have been dealing with recorded seminars or more of that situation that didn't go well. So, it's made a huge, huge, huge difference to my ability to be involved and I've been really glad that it's been possible to do."*

Online students mentioned that getting access to the MS Teams seminar recording was an additional incentive to attending online, especially for international students who made extensive use of the auto-transcription.

Two students in our sample reported that less confident students especially seemed to appreciate greater staff use of the MS Teams chat and whiteboard functions; this allowed students reluctant to speak out loud to still participate in other ways, unlike in-room only seminars.

5. ADAPTIVE SOLUTIONS AND NON-STANDARD USE

Some students were asked by staff to act as facilitators between online and in-room students when staff weren't as confident using HyFlex or MS Teams initially; their roles included monitoring the chat and hands-up on MS Teams or repeating questions from in-room students out loud to those online.

Group work was especially successful when this was encouraged by staff. Some members of staff asked volunteer in-room students to use their own devices to set up separate MS Teams group calls with those online in order to allow group activities to be more student-led and mixed.

Students reported being appreciative of staff having alternative plans in place if they could not immediately share visual learning aides with those online; they would send links to videos and presentations via the MS Teams chat, for example:

> *"When the video is not working, if they distribute a link in the chat, then people can watch it on their own devices, while the class is watching it, and then come back to the Teams core group."*

Staff and students also had multiple alternative plans in place in case of technical issues experienced by those online. For example, students reporting realizing they needed to adjust their MS Teams audio settings or being asked by staff to leave and then return to the call. Additionally, students appreciated the use of subtitles, particularly those for whom English was not their first language.

A few staff members also came up with ad-hoc solutions so those online could better tell who was speaking in-room. i.e., connecting via another laptop device and carrying this around the room so the camera showed speaker faces more closely and clearly:

> *"When somebody was speaking, she was actually going to that person with the laptop so that other people in the room could see the class from high up and also could see whoever was presenting or speaking."*

However, several students reported one instance of non-standard use which was not as successful. When staff also chose to present online, this made the HyFlex experience worse for in-room students.

6. STAFF LACK OF CONFIDENCE WITH TECHNOLOGY

Several staff were reported to have struggled with using the in-built MS Teams functions; breakout rooms, screen sharing etc. These staff members seemed aware of this and therefore arranged setup with campus audio-visual teams before seminars started:

> *"There were two people who came to help with the technology and then also just helped us to divide into different groups."*

Students emphasised that more interactive online tools, such as MS Teams poll use etc. worked well for confident staff only.

A key student recommendation was therefore the provision of more staff training or troubleshooting tips on the HyFlex equipment and MS Teams use by the university prior to their first class.

Several chose to provide additional information such as the number of sessions they attended (ranging from 1 to 15), whether they attended online, in-room or both (7, 6 and 27 respectively) and report how many students usually attended online (1-50) or in-person (2-30) during HyFlex seminars.

7. GROUP WORK AND INTERACTIONS BETWEEN STUDENTS

Student feedback on group work during HyFlex classes was mixed; some found group activities worked as an equalizer between the in-room and online experience if it worked well, or were a key dividing factor if it didn't:

> *"The groups were formed from the people who were in the room. We had different groups for those in class and the ones who were attending it online. We didn't get even a single chance to interact with them."*

Group configurations were often decided on the spot, not planned by staff ahead of time. Staff either chose to separate online and in-room students, or combined them by asking those in-room to join the main call or set up separate MS Teams calls themselves. Online students reported feeling more included if mixed groups were used:

> *"I think making use of the breakout rooms more [...] I found that I was a bit more engaged in the session, rather than just sitting there. Oh, they're talking, I'm just going to sit here, and I'll go to the toilet, or get a drink, or do something, rather than, actually, participating in the exercise."*

Lower student numbers online were mentioned by several students as a reason why mixed group activity was not as successful for some courses – a certain "critical mass" was needed to allow both cohorts to interact well.

DISCUSSION

Overall, several themes were identified by the research. In terms of the first research question focusing on the opportunities provided to students with this approach, one key theme was expressions of gratefulness for the flexibility afforded, especially since the majority could choose whether to attend online or in-room on the day without having to inform the staff

member ahead of time. Multiple students said they were grateful that this option was available as an alternative to online-only study during the pandemic. Students also appreciated how quickly this was offered by the university.

There are several points to note when taking into account the authors in the aforementioned framework. Fredricks, Blumenfeld and Paris (2004) define learner engagement as being composed of three parts: behavioral, emotional and cognitive. Our main focus was on cognitive engagement. Our results show that cognitive engagement worked well when there was greater acceptance of the technology – building on research by Venkatesh and Davis (2000) around perceived usefulness and the technology acceptance model – and a key challenge for increased adoption was a lack of ease of use. An insight from this research that has wider applicability is the benefit of online and on-campus graduate teaching assistant support to help resolve technical issues and hence increase technical acceptance. This can potentially reduce the workload of the academic and improve seminar flow, as evidenced by student feedback in the results.

Additionally, Radcliffe's (2008) proposition that technology in a learning space needs to take into account three areas – technology, pedagogy and space – should be considered. The results suggest that the interplay of these three variables is important for understanding how best to teach students and resolve issues, and the results provide examples of how they overlap in practice. Furthermore, when taking into account the TPACK structure of Mishra and Koehler (2006), who argue that technology, pedagogy and content knowledge are important for effective learning, our results have shown that certain disciplines or content areas (C) create specific demands for the (T) technology and (P) pedagogical approach. One specific example quoted in the results is of STEM students requesting the location of cameras and microphones be changed to ensure visibility. Suggestions for improvement varied by discipline, this further supporting the applicability of Mishra and Koehler's (2006) framework.

Students gave several reasons for attending HyFlex online, including pandemic-related reasons such as suspected or diagnosed COVID-19 and travel issues for international students. The benefit to international students is in line with previous research by Archee, Dawkins and Gurney (2021). Other reasons given included reducing travel time and cost, strike action affecting transport and staff attendance, and childcare and work responsibilities for part-time students. The advantages for certain student demographics such as disabled or injured students were also mentioned, making clear that their attendance of a particular course would not have been possible without the option to attend HyFlex online.

In addition, students mentioned the ability to receive the auto-generated recording and transcript from MS Teams afterwards as a key advantage of online attendance, especially those for whom English was not a first language.

In terms of the challenges students experienced from this approach looked at in the first research question, the importance of an institution needing to consider relevant mitigation approaches suggested by students was highlighted. For example, several students suggested that low online learner engagement could be mitigated by staff encouraging active student participation and interaction between the cohorts via assessments to monitor understanding and by directly addressing the cohorts during classes.

Audio issues were resolved by technical solutions as well as, to some extent, changes in staff and student behavior when learning. For example, staff used the chat, whiteboard and polls on MS Teams to bridge the gap between online and in-room students. Assisting those online directly via the provision of graduate teaching assistant or student volunteer facilitator support was also used effectively by staff to help solve technology issues. Additionally, the results indicate that the audio-visual team support was appreciated by students when called on by staff, and it was clear how critical such support is for the overall hybrid flexible learning experience.

Nonetheless, when looking at how students perceived HyFlex compared to traditional in-room attendance, there was a greater preference overall for fully in-room teaching. This contrasts with research by Shek et al. (2022), which argues that students appreciate the flexibility of HyFlex to a greater extent. However, it must be noted that, during the pandemic, such an approach was not possible due to national restrictions due to COVID-19. Interestingly, an earlier internal social identity scale study conducted by King's College London (Dommett & Detyna

2021) showed that students felt that online learning offered a poorer sense of belonging and identity compared to in-person learning, and that HyFlex online only was preferred to in-room attendance.

In terms of the second research question looking at how students learned through HyFlex, multiple uses of different MS Teams functions such as the chat, screen sharing of visual aids, whiteboard and polls etc. were mentioned by the participants. For group work in particular, the breakout room and separate calls functions were used to great effect by some staff. The research highlighted, however, that this worked better when used by staff who were confident with the technology. These points are reflected in the data via the theme of staff lacking confidence with technology, with students reporting that seminars ran more smoothly when more confident staff used more software features, many specifically mentioning the benefits of breakout rooms for greater group discussion.

Looking at the third research question, asking what students felt they gained most from their experience, the data highlighted several successful methods being used by staff. Ensuring good technical understanding was crucial for staff to be able to lead classes appropriately, and this finding builds on previous research by Boylan et al. (2022). Students mentioned that being introduced to HyFlex before classes to set expectations was particularly helpful. Additionally, on-campus students often mentioned online student reluctance to engage being a key barrier to successful interaction. Conversely, online students were also grateful when staff reminded students in-room of the need to include those online. We would therefore recommend the use of a code of conduct for both online and in-room students in higher education institutions using hybrid teaching; the university in question later produced and disseminated one internally. Moving forward, there is also a need to be mindful of the balance between guidance and self-regulated teaching as recommended by Marín and Salinas (2022).

Additionally, when looking at what students felt they gained most from their experience, staff adaptation was highlighted as a key solution. Students reported being grateful that staff were resilient in finding alternative teaching solutions quickly if their initial approaches didn't work.

In terms of the limitations of this study, we should be careful not to over-extrapolate these results. The results must be situated in this specific context – a London institution during the pandemic. This meant that our recruitment and data-gathering took place entirely online and potentially this could mean participants who agreed may have been more digitally literate. Additionally, we should note that this study was more qualitative than quantitative in nature. This is not a limitation per se as the qualitative nature of this study meant that we accessed a richer understanding of the student experience, but additional quantitative data could have further illustrated the data statistically. Our small sample of 40 could be seen as a limitation, but we feel the sample size was adequate given the qualitative nature of the research, and in light of our inclusion of a wide range of participants across levels of study and faculties.

However, whilst being mindful that we cannot be certain of overextrapolation, we should also not make the reverse mistake of stating the results have zero wider applicability. The sample is fairly representative of the wider university. In the institution as a whole, 60.2% of students are undergraduates, and our sample had 50.2% foundation and undergraduate students, for instance. The schools in our sample were also those that have used HyFlex at this institution. Our sample had a broad mixture of different disciplines, with the following disciplines all represented: Arts and Humanities, Social Science and Public Policy, Institute of Psychiatry, Psychology and Neuroscience, Law, Faculty of Life Sciences and Medicine, Natural and Mathematical Science, Foundation and Business School.

In terms of the wider applicability of our results, while the demographic and cultural background of London-based university students is somewhat unique, it is clear that they share a common thread with other learners, certainly around learner engagement. Going back to the conceptual framework mentioned in the introduction, Venkatesh and Davis's (2000) point around perceived ease of use being a pre-requisite for technology adoption was proven true here.

Another recommendation from this research which has wider applicability is around support. To help resolve some of the challenges mentioned above, we would recommend hiring graduate teaching assistants to provide day-to-day teaching support; and teaching fellows with expertise in the technology to provide support in all three of the areas Radcliffe (2008) identified.

Other recommendations for future research include considering case studies of the use of a hybrid teaching approach in other contexts, such as for improving accessibility for students with disabilities or family commitments. Another option would be exploring whether there are differences in implementation by staff in different faculties. Institutional factors will determine whether this is possible for widespread rollout in a given institution.

CONCLUSION

Overall, the results show several benefits and challenges from the student perspective, although the pandemic context under which the learning took place must be noted. Specifically, one needs to bear in mind the isolating effects of the pandemic, and Wu and Teets (2021) argued that the pandemic negatively affected student engagement, so our results should be seen in this context. Several themes emerged from the data, including students expressing gratefulness for staff finding alternative solutions to ensure teaching continued and both cohorts were engaged. Key challenges highlighted by the data related to audio quality for those online, as well as student conduct (as detailed in theme 2), particularly for online students. Our results suggest that solutions to this should be mindful of the technology, pedagogy and discipline background elements as suggested by the TPACK framework of Mishra and Koehler (2006).

In this institution, this research led to a direct change in institutional policy and practice, specifically around encouraging appropriate student conduct. It was recognised that students had a shared responsibility in helping create an effective learning environment, and a code of conduct for both online and on-campus students was created.

Most notably, the data uncovered a range of reasons for student use, ranging from convenience such as travel time and cost, helping with childcare and work responsibilities, disability and injury, as well as pandemic-related reasons such as travel restrictions and COVID-19 diagnosis.

Finally, the research highlighted the range of techniques and software functions used by staff to engage both online and in-room students, especially those used for successful group work. In conclusion, this study provides ample evidence of both reasons for, and challenges and solutions associated with, hybrid flexible learning.

NODE KEY	PERCENTAGE SIMILARITY
Student introduction to HyFlex	100%
Number of sessions	100%
Student guidance received	100%
Engagement with AV/IT	66.67%.
Suggestions for AV	100%
Engagement with faculty	100%
Student feedback on HyFlex	100%
Student numbers overall & online vs. in-room	100%
Staff confidence with tech	100%
Teaching formats	85.71%
Software used	100%
Theories used	0%
Adaptive solutions used	100%
Online student conduct	100%
In-room student conduct	0%
Changes over time	75%
Problems with tech	88.89%.
Other negatives of HyFlex	100%

(Contd.)

Appendix 1 This chart shows agreement between two researchers on specific nodes in the coding framework, for the inter-rater reliability metric for a specific interview.

NODE KEY	PERCENTAGE SIMILARITY
Reasons for attending online	100%
HyFlex positives	100%
Interactions between students	100%
Continuation of learning	100%
Comparison of student experience	100%
Engagement of students online	80%
Engagement of students in-room	100%
Group work	100%
Non-standard use	100%
Suggestions for guidance	100%
Room use	50%
Overall suggestions	66.7%
Position of tech - microphones and cameras	100%
TOTAL	**90.91%**

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

MD: Research design, contribution to analysis, writing manuscript, editing. MK: Data collection, transcription, contribution to analysis, contribution to manuscript, editing.

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