Students' perceptions of online lecture delivery: An empirical mixed-methods investigation

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As the Covid-19 pandemic continues to shape and disrupt teaching provision in Higher Education, educators have responded with a swift pivot to online teaching for the 2020–2021 academic year. The debate surrounding the pedagogic utility of pre-recorded 'asynchronous' versus live 'synchronous' lecture modality continues to grow among teachers of psychology. We surveyed 279 students from across an undergraduate Psychology programme and investigated their preference for (a)synchronous lecture delivery, perceptions of online lectures, and self-reported lecture-watching behaviours. Overall, our results demonstrated that students enjoy both the structured nature of live lectures and the flexibility of pre-recorded lectures. Live lectures are useful at instilling social connections, but pre-recorded are more useful for understanding subject content. Taken together, students show a strong preference for a hybrid approach to online learning of both live and pre-recorded teaching sessions. However, students highly value enthusiastic, engaging lecturers, which largely outweighs any preference for specific delivery modalities.
Keywords: *online education; Covid-19; best practice; student engagement.*

STUDENTS' perceptions of best practice in online lecture delivery: An empirical mixed-methods investigation

The Covid-19 pandemic and subsequent shift to online teaching has prompted a reappraisal of practice in Higher Education on a global scale. Every country, institution, and field of study has developed its own approach to online teaching. This has resulted in diverse pedagogic approaches, each with varying levels of effectiveness, evidence-base, and transferability. Crawford et al. (2020) provide a useful synthesis of twenty countries' online teaching responses, noting the various ways in which university curricula have been rapidly adapted to meet the needs of staff and students in a socially distanced context. Similarly, Marinoni et al. (2020) and Aristovnik et al. (2020) also provide global perspectives on the shift to online learning, each noting the pedagogical challenges with which educators are now faced. As such, it is necessary to understand how student satisfaction, wellbeing, and engagement are affected by online teaching. Online teaching provision has important pedagogical implications that must be carefully scrutinised, particularly in light of claims that Higher Education is unlikely to return to its pre-Covid-19 state of 'normality' (Kalantzis & Cope, 2020).

This disruptive shift to online delivery has prompted Higher Education providers to consider best practice in online education. Bao (2020), for example, shares five best practice principles for online education in China, which include student support, contingency planning, and effective delivery. In the UK, Nordmann and colleagues (2020) provide '10 simple rules' for online teaching in Higher Education, stressing the importance of community building, setting clear expectations, and appropriateness of assessments. Importantly, Nordmann et al. also recommend the provision of a mixture of both 'live' synchronous and recorded asynchronous content. The authors note that pre-recorded asynchronous content will

'allow students to engage with their studies flexibly', (p.5) because it allows for an 'anytime, anywhere' approach to learning that does not restrict participation. In contrast, synchronous activities provide 'social and academic networking opportunities' (p.7) that are also useful for students. The debate surrounding the pedagogic value of live synchronous teaching versus recorded asynchronous teaching has played an important role in the pivot to online education. However, students' preference for, and engagement with, synchronous and asynchronous delivery remain unclear.

Pre-Covid-19, studies questioned the ways in which students engage and interact with online teaching content that is either presented synchronously or asynchronously. For example, Chou (2002) noted that social-emotional interactions in a distance learning environment were more prevalent in synchronous 'live' teaching. However, students in asynchronous classes engaged more in task-oriented interactions. Similarly, again in a distance learning context, Offir et al. (2008) demonstrated that while asynchronous learning can have lower-levels of interaction between staff and students, this can be overcome by encouraging students to engage in deep-level processing, by asking high-level questions.

This tension between teaching delivery method and quality of interaction might be best understood by Oliver and McLaughlin's (1996) model of interaction dimensions in teaching. Oliver and McLaughlin suggest that there are five core dimensions of student-staff interaction in teaching: social interaction (e.g. rapport building), procedure interaction (e.g. explaining course structure), expository interactions (e.g. demonstrating skills), explanatory interactions (e.g. explaining the content) and cognitive interactions (e.g. via feedback, discussion, and debate). Twenty years before the Covid-19 pandemic, Offir and Lev (2000) note that explanatory and social interactions are more akin to face-to-face in-class teaching, whereas procedural and expository interactions are more frequent in distance learning. It is therefore timely to assess how online teaching prompted by the Covid-19 pandemic may impact staff-student interactions and, more broadly, the student experience as a whole.

Taken together, this evidence demonstrates that the delivery method affects students' experience of learning. More recently, there have also been discussions of how (a)synchronous delivery impacts student understanding and attainment. Nieuwoudt (2020) conducted a study of academic success and engagement with synchronous and asynchronous teaching sessions. They found no difference between students who engaged with synchronous and those who engaged in asynchronous sessions. Conversely, Guo (2020) showed that Physics students' attendance of optional synchronous sessions was associated with better average test grade. Students who attended 'live' sessions found the course less difficult than those who learned only via asynchronous learning. However, this benefit of attending the synchronous sessions may be due to the extra teaching hours. Therefore, it may be that there is a high level of context dependency and nuance in the utility of (a) synchronous teaching provision, particularly in the Covid-19 pandemic context when many other aspects of students' lives are also disrupted.

This notion of nuance and individual difference within delivery preference is corroborated by Beyth-Marom et al. (2005) who demonstrated that preference for asynchronous or synchronous sessions depends on students' 'learning habit inclinations'. Those who prefer synchronous sessions viewed interactions with staff as more positive and had a lower need for autonomy, compared with students who prefer pre-recorded content. Therefore, it is important, as with much pedagogic work, that students are consulted and listened to in these conversations. Some work has begun to address this: Chen et al. (2020), for example, asked students about their perceptions of (a)synchronous learning delivery and found

that students enjoyed either synchronous recorded live lectures or asynchronous lectures with a live question and answer session. Similarly, Kaczmarek et al. (2020) reported that both students and academic staff thought that recorded live lectures were the optimal virtual class delivery method. In a recent compendium of practice in online delivery, Puhr (2020, p.8) reports that a remote learning survey showed that 'students loved the messy but authentic recordings of live sessions.' However, the evidence base detailing students' preference and perception of live versus pre-recorded lecture delivery modality, in the specific context of online teaching prompted by the Covid-19 pandemic, is currently in its infancy.

To address and extend these enquiries, we investigated Psychology undergraduate students' perceptions of both synchronous and asynchronous lecture delivery, their lecture-watching behaviours, and their accounts of what constitutes a good online lecture. This mixed-methods study was largely exploratory, given the inconclusive findings from previous work in this area. We aimed to address the lack of student voice in current commentaries surrounding 'best practice' of teaching and learning in an online era, by centring students' perceptions in this ongoing discussion.

Method

Participants and design

Participants were 279 undergraduate Psychology students enrolled at the University of Leeds, which is a research-intensive UK university. The sample was predominately female (87.8 per cent). 45.9 per cent of participants were in their first year of study, 26.2 per cent were in second year, and 26.9 per cent were final-year students. 0.4 per cent of participants were on a 'Year in Industry' and three students left this blank. 24 students were 'mature students' (i.e. over the age of 21 when commencing their studies). Participants were recruited via emails and posts on the Virtual Learning Environment. Ethical approval was granted from the local ethics committee on 20 October 2020 (Reference: PSYC-109).

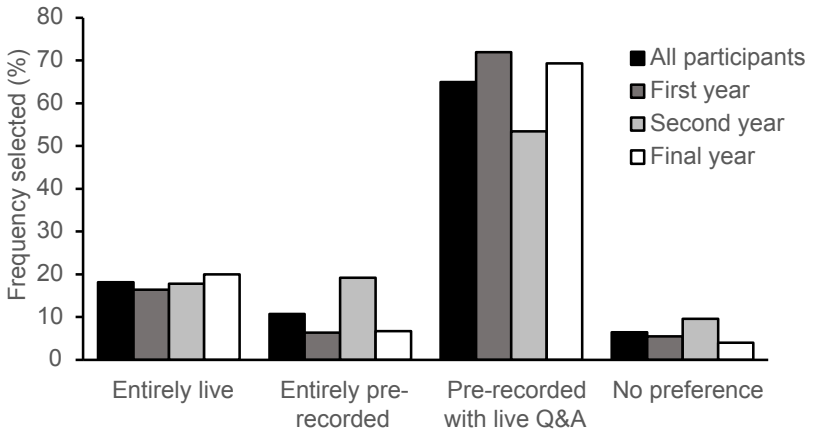
The online lecture preference items reported here were part of a larger questionnaire, which assessed other facets of the student experience, including assessment and feedback practice, learning community, and inclusion. Data were collected during late October and November 2020, at which point students were in the latter part of their first semester of online teaching. We were able to ask questions of lecture provision, given that we are situated within a large School of Psychology and are currently offering a mix of pre-recorded and live online lecture delivery.

Procedure

The survey was hosted on Qualtrics. Following giving informed consent, participants provided demographic information including gender, year of study (first/second/year abroad/year in industry/final year) and whether or not they were a 'mature student'. We then asked participants where they were living during the semester (at home/in student halls/in a house with other students/alone) and whether they live with other psychology students. We asked whether they have any regular contact, including online or in-person, with other psychology students outside of timetabled classes. Participants were then asked to rate their overall confidence with using learning technologies on a 0 (not at all confident) to 100 (extremely confident) scale.

The next section of the questionnaire asked students about their lecture experiences this semester. We first asked whether they had received 'live' lectures so far in the semester (yes/no). Those who answered yes were given a separate set of questions that asked whether their engagement, amount of time spent on content, enjoyment, and understanding of the content had one=gone up significantly to seven=gone down significantly, compared with pre-recorded online lectures.

Figure 1: Participant preference for synchronous and asynchronous delivery methods.



First, we asked participants to explicitly state which lecture modality they prefer (entirely live, entirely pre-recorded, pre-recorded with a live Q&A, or no preference). Participants were provided with a free-text box and were encouraged to explain their preference of delivery, to allow us to qualitatively assess student perceptions. To investigate lecture watching behaviour by delivery type, we then asked participants to tick from a list of six behaviours which they typically engage with in either live or pre-recorded lectures (e.g. 'taking breaks', 'making notes as the lecturer is speaking').

To investigate perceptions of live and pre-recorded lectures, we asked participants to indicate their agreement with nine descriptors of live or pre-recorded lectures (e.g. 'engaging', 'easy to follow', 'stressful') on a three-point scale ('entirely', 'somewhat', 'not at all'). We then provided participants with three free-text boxes and asked them to indicate the three 'most important factors' that make up a 'good online lecture'. The full version of the questionnaire can be found here: https://osf.io/x3ptk/?view_only=e22141719be444c6bc8901fbc6e91892

Results

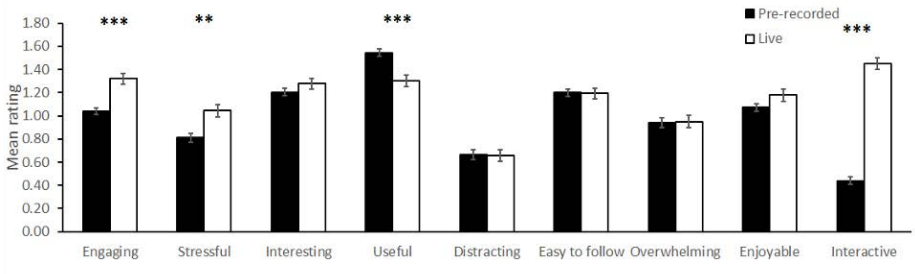
On average, participants rated their confidence with using learning technologies as generally good (73.9 per cent). Overall, participants generally demonstrated a preference for the module content to be delivered asynchronously but supported by live question and answer sessions (64.9 per cent; see Figure 1). Interestingly, there was a greater preference for entirely asynchronous delivery (i.e. no live component) for second year students (19.2 per cent agreed), compared to second and final year students (6.3 per cent; 6.7 per cent).

Next, we wanted to understand whether there were differences in students' perceptions of live and pre-recorded lectures. Participants were asked their agreement on nine measures of lecture quality on a three-point scale for live and pre-recorded lectures. These responses were coded with a 2 for 'Entirely', 1 for 'Somewhat', and 0 for 'Not at all' and the mean rating for each measure was calculated for live and pre-recorded lectures (Figure 2).

A one-way ANOVA demonstrated that live lectures were found to be significantly more engaging ($F_{(1,418)}$=25.96, p<0.001) and interactive ($F_{(1,418)}$=318.13, p<0.001) but were also more stressful ($F_{(1,418)}$=11.05, p=0.01). However, pre-recorded lectures were considered significantly more useful ($F_{(1,418)}$=19.32, p<0.001)

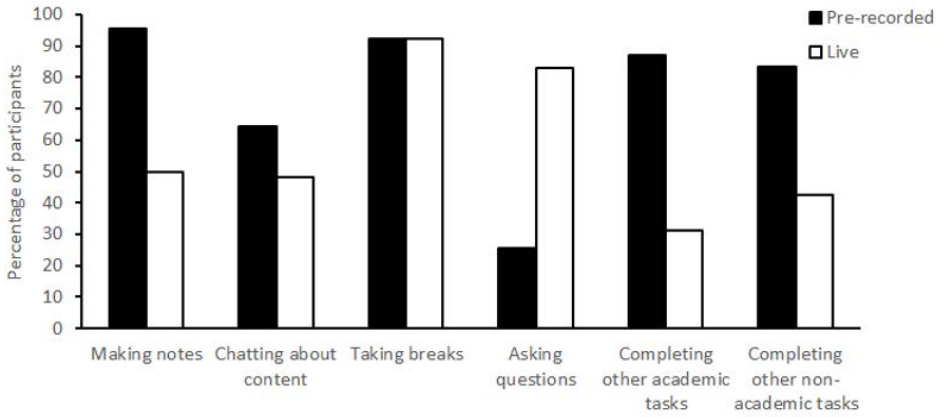
We also wanted to understand whether students' lecture watching behaviour differed during live and pre-recorded

Figure 2: Shows students mean rating of nine measures for pre-recorded and live lectures.



** = $p<0.01$. *** = $p<0.001$.

Figure 3: Frequency of self-reported lecture watching behaviours, by lecture delivery.



lectures. A greater number of participants indicated that they made notes and discussed the content with their friends during pre-recorded compared to live lectures. Participants also appear more distracted during pre-recorded lectures, with a greater number of students indicating that they completed other academic and non-academic tasks during pre-recorded compared to live lectures (Figure 3).

Qualitative analysis of textual responses

After students indicated their preference for the different lecture formats (see Figure 1), they were asked to explain their answer. These textual responses were analysed using a qualitative content analysis approach (QCA; Schreier, 2012). One author (RH) initially coded the verbatim responses in full, before a second author (MP) reviewed the codes and discussed the data. Overwhelmingly, the students who indicated a preference for synchronous lectures attributed this to a desire for routine in their timetable. For example, students preferred 'having a set time' to complete the lecture, and a preference for learning that is strictly bound by a timetable. This enables students to plan their studying time and not 'get behind' on lecture content. For example, one student commented that live lectures have been useful at establishing structure and routine:

> Having had one live lecture has helped me so much with structure and getting the work done. Pre-recorded lectures are too easy to walk away from and I find that lecturers rush through the content so there is too much to process within the lecture time – it's not concise enough.

This notion that live lectures instil a sense of routine to an otherwise unstructured timetable was echoed throughout the data. For example, one student noted that synchronous lectures 'would mean that (they) watch it at the correct time'.

However, students who indicated a preference for pre-recorded asynchronous lectures also cited time management concerns as a reason for their preference. Students who preferred asynchronous lecture delivery noted that the flexible nature of engaging with pre-recorded content allows them to approach their studies in a way that works for them. For example, one student noted that:

> Pre-recorded lectures are preferably delivered due to being able to follow my own timetable and schedule things around each lecture similarly each day.

Similarly, another student who preferred pre-recorded lectures noted how they 'like being able to choose when [they] do the lectures'. Therefore, this suggests a trade-off between the flexibility afforded through asynchronous delivery, and the structured approach that synchronous delivery allows. Unsurprisingly, therefore, the majority of students indicated a preference for a hybrid approach. That is, pre-recorded lectures with the opportunity to engage in a live question and answer session with the lecturers. It appears that this hybrid model offers a useful 'middle ground' between (a)synchronous delivery options. For example, one student noted how the tensions of wanting a structured yet flexible approach to studying can be facilitating by this hybrid delivery option:

> I like having pre-recorded lectures so I can watch them when it suits me, but I know I need a structured schedule and live lectures would force me to stick to this. So at least with this option I have freedom but also a requirement to have engaged with the content prior to the live session.

One student referred to this explicitly as offering 'the best of both worlds' and others noted that the ability to pause pre-recorded lectures, coupled with the opportunity for interactive engagement of live question and answer sessions, is the optimal delivery option. For example, one student explained:

> When pre-recorded, I have the ability to pause and make notes if the lecture is going too quick. This flexibility is perfect in my eyes, and you can go back and re-watch sections that may not have made perfect sense at the time. I also like the opportunity to ask questions and engage, so the opportunity of a live Q&A is ideal.

Importantly, when taken together, these results suggest that a varied, hybrid model of lecture delivery is preferable to students. Pre-recorded lectures are useful in allowing students to 'go at [their] own pace' with the option to pause, take breaks, and have a flexible approach to studying.

However, there are also clear advantages in offering live lectures, that extend beyond timetabling concerns. For example, students who indicated a preference for live lectures also noted that live lectures serve to foster a sense of togetherness and learning community in the online teaching context, that can be useful at negating the isolation of learning online. For example, one student commented that live lectures 'helps [them] feel less alone' and another noted that 'pre-recorded lectures are quite lonely, live lectures takes some of this away'.

Moreover, it is also important to recognise that, of the students who indicated a preference for live lectures, some students attributed this to a desire for a 'normal university experience'. For example, one student noted that they would like live lectures, on account of them reflecting more closely 'a regular university experience'. Another student noted that '[live lectures] imitate what university would be like if we had lectures in person'. This perception of live lectures more closely emulating percep-

tions of a 'regular' university experience should not be overlooked, as this is likely to affect student wellbeing, as students grapple with the loss of their 'normal (university) life' in the context of Covid-19. Indeed, any attempts to promote feelings of normality should be encouraged.

Factors that make a good lecture

Next, to qualitatively analyse the factors that students associate with a 'good lecture', we followed the conventions of qualitative content analysis (QCA) as defined by Schreier (2012). After a thorough collective read through of the data, one author (RH) initially coded each response for its overall theme, which formed 13 codes. Then, a second coder (MP) reviewed the codes, discussed any discrepancies, and finalised the codes (Table 1).

Of the 766 textual responses (M_{words}=5.36, *SD*=5.58), the majority of participants reported that one of the most important factors in delivering a good lecture is the lecturer having an enthusiastic and engaging style (*N*=139, 17.91 per cent). For example, responses under this category included content such as 'keeping student engaged', 'engaging tone', and 'speaking in an engaging way'. Conciseness of the lecture was also frequently mentioned as an important factor (*N*=105, 13.53 per cent). This code included responses such as 'the lecturer keeps to time', 'not running over', 'not too long' and 'realistic length'.

Clarity of lecture content was the next most common response (*N*=104, 13.40 per cent). Responses under this code referred to the lecturers' ability to explain the content well (e.g. 'clearly explained' 'explaining everything clearly' 'good explanations'), as well as clarity of the overall aims and expectations of the lecture (e.g. 'clear learning objectives', 'breakdown of aims at the start'). Eighty-seven of the responses (11.21 per cent) were coded as pertaining explicitly to the lecturer's use of PowerPoint slides to assist comprehension; for example, under this code some students noted that the design of slides was important (e.g. 'clear headings in slides', 'use of pictures', 'visually interesting slides', 'engaging slides'), whereas others noted that the quantity of content was also important (e.g. 'not too much irrelevant text', 'not too many notes under the slides'). Other factors, as detailed in Table 1, included the interactivity of the lecture (e.g. 'interactive activities'), structure (e.g., 'clear logical structure'), use of technology (e.g. 'good sound quality'), ability to take breaks (e.g. 'broken into chunks'), and speed of delivery ('not going too fast'). Responses coded as 'other' were related to other generally more logistical factors, such as timetabling and consistency between lectures.

Finally, some of the less common categories included the use of additional support to complement the content in the lecture (*N*=21, 2.71 per cent), which typically related to reading (e.g. 'highlighting key reading') but also to more diverse resources (e.g. 'using video clips'). Interestingly, the notion that the lecture is perceived to contain interesting content (e.g. 'new and interesting content'), was among the less frequent responses (*N*=20, 2.58 per cent), as was the chance to ask questions (*N*=19, 2.45 per cent).

Discussion

In this study, we aimed to investigate students' perceptions of online lecture delivery modalities, in the specific context of Covid-19 online teaching. This mixed-methods investigation has demonstrated high levels of variability in the student experience in an online context. Overall, our data suggest that delivering online lectures 'live' may be useful for instilling a sense of routine and structure to online learning, whereas pre-recording lectures and delivering them asynchronously allows for a more flexible, student-led approach to online learning. Therefore, it is perhaps unsurprising that students overwhelming prefer the delivery method of pre-recorded lectures with an optional 'live' question and answer session. As one student noted, this hybrid

Table 1. Qualitative response categories and frequency.

Content category	Frequency (%)
Engaging lecturer style	139 (17.91%)
Conciseness	105 (13.53%)
Clarity	104 (13.40%)
Effective use of slides	87 (11.21%)
Interactive	55 (7.09%)
Well structured	51 (6.57%)
Good use of technology	47 (6.05%)
Ability to take breaks	44 (5.67%)
Speed of delivery	44 (5.67%)
Other	30 (3.87%)
Provides additional support	21 (2.71%)
Interesting content	20 (2.58%)
Chance to ask questions	19 (2.45%)

option provides the 'best of both worlds' in online delivery. However, this recommendation should not be applied too prescriptively. Beyond the quantitative data, the qualitative comments noted that students generally highly value having enthusiastic, engaging lecturers, which largely outweighs any preference for specific delivery modalities.

The notion that students attribute a 'good lecture' to the qualities of the lecturer, rather than more logistical, practical issues of delivery modality, is corroborated by pedagogical literature pre-Covid-19. For example, Taylor et al. (2012) examined student perceptions of 'good lecturing' and noted that subject knowledge, willingness to help, and inspirational methods make for a 'good lecturer'. It is important now to translate these findings to the specific challenges of engaging students that Covid-19 has prompted. For example, our data suggested that a lecturer's enthusiasm for the content was a wholly important factor for a good lecture. Given the challenges in engaging students fully via a computer screen rather than in-person teaching, enthusiasm may be of increased importance in an online teaching space. This goes some way to resolving the synchronous versus asynchronous debate that pervades the pedagogic literature. It may be unhelpful, or at least counterproductive, to pit live teaching against pre-recorded teaching, and instead educators need to focus on the fundamental properties of a good lecture.

Beyond this, our qualitative analysis of students' responses also demonstrated how live lecturing can be an important source of social connection and belongingness for students in a Covid-19 context. While the majority of students demonstrated a preference for a hybrid approach to lecture delivery, any efforts to improve the social isolation caused by Covid-19 should not be overlooked. This is particularly crucial, given the mental health concerns associated with social isolation in students (Cao et al., 2020; Hamza et al., 2020), and that as many as one in five college students are diagnosed with a mental health disorder (Oswalt et al., 2020). Therefore, although quantitative data showed how live lectures were perceived by students as less useful than pre-recorded lectures, live teaching may be fulfilling a different purpose for students, that goes beyond the ability to understand subject content. As Nordmann et al. (2020, p.6) suggest, text-based (i.e. not 'live' face-to-face) communication is a

'reduced form of social presence due to a lack of nonverbal cues'. Live lectures provide the opportunity for more social, spontaneous communication. Therefore, a hybrid approach to lecturing allows for a meaningful social presence, facilitated through live lectures, whilst also encouraging flexible engagement with subject content via pre-recorded lecture delivery. This finding also highlights the importance of embedding a strong sense of student voice in evaluations, as quantitative metrics alone do not capture this level of nuance.

Our study also demonstrated that students highly value factors such as lecturers' use of slides, lecture clarity, and conciseness of online lectures. However, it is worth caveating this by noting that in this study, we did not assess the 'quality' or subject content of the pre-recorded or live lectures. It is likely that there are individual differences between lecturers as well as students, which contribute to some of students' perceptions. Future research should thus investigate staff perceptions of online lecturing, as well as understanding the student perspective.

The results of this study may be useful in providing some initial guidelines for staff designing lectures online. That is, these data provide a set of important factors that staff should keep in mind when developing online lectures. This work thus contributes to the ongoing attempts to improve the function, design and use of online teaching tools. For example, Fyfield et al. (2019) provide a useful set of recommendations for lectures using videos in teaching, noting how the design, development, and application of video technologies should be improved first before assessing student perceptions of these tools.

This study ultimately contributes to the ongoing investigations of 'best practice' in online teaching prompted by the Covid-19 pandemic in a UK psychology context. Other recent empirical research examining the impact of online teaching in different countries have, to date, have included appraisals of online teaching in Nigeria (Jacob et al., 2020), the Philippines (Toquero, 2020) and India (Jena, 2020), all of which have unique contexts that affect the provision of online teaching. Our study provides some early evidence that demonstrates to psychology educators in the UK that whilst lecture modality may be important, other factors such as lecturer enthusiasm and clarity of content contribute equally, if not more, to students' perceptions of learning during Covid-19. This work should lead to studies that investigate other facets within student education that have been affected by Covid-19, for example, the impact that online teaching has on perceptions of assessment and feedback (see Unger & Meiran, 2020), academic attainment, and students' sense of belongingness.

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