CASE STUDY

Reflections on remote teaching

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Abstract

The COVID-19 pandemic has forced us to reconsider the way we teach our students. The inability of UK-based lecturers to deliver via traditional lecture-based courses in China (due to ongoing travel restrictions) has been an obstacle to overcome but also an opportunity to investigate innovative remote-teaching methods. Here we review a case study based on teaching three different year groups at the Jinan University - University of Birmingham Joint Institute during the early part of 2020. We reflect on how technology was used, draw conclusions and discuss potential opportunities for the future of remote-teaching.

Keywords: Remote-teaching; technology; flipped learning; Zoom; distance-learning

1. Introduction

The ongoing COVID-19 pandemic highlights that in extreme circumstances we must rely on remote-teaching if the disruption to the education of our students is to be minimised. Notably, opportunities to develop methods present themselves when lecture-based teaching methods are unavailable. In this paper we focus on various methods of remote-teaching available and present a case study of distance-learning which took place at the Jinan University (JNU) - University of Birmingham (UoB) Joint Institute (J-BJI).

2. Background

At the J-BJI based in Guangzhao, China, flying faculty lecturing staff (herein referred to as lecturers) are UK-based lecturing staff who fly out to China to teach 20-credit core mathematics modules within a standard BSc UK degree programme in Applied Mathematics.

Increasing movement restrictions within China in January 2020 ultimately led to the decision that staff could not travel to Guangzhou to deliver teaching in person for the foreseeable future. To deliver live sessions, Zoom software (Zoom, 2020) was procured during the week before delivery began, having tested: Skype for business; Big Blue Button; Skype; and WebeX. Lecturers were not sure how well Zoom would work. The main concern was that students would need to access Zoom from their homes and we could not guarantee the speed of their internet connections. An additional concern was the inevitable change in nature of verbal interactions between staff and students, previously being face-to-face. In practice, however, students seemed to adapt quickly and Zoom proved to be an effective tool to facilitate staff-student interaction. For our teaching we would use: the virtual learning environment Blackboard, Panopto, Möbius and Zoom.

Semesters consist of four consecutive four-week teaching blocks, during each of which, typically, 10 credits is delivered by UoB staff to each year group (in addition to credits delivered by JNU staff). The start of the semester was delayed by two weeks, which meant the initial four-week teaching block was condensed into three weeks. Condensing teaching blocks to three weeks has occurred in the past and student feedback (via student representatives and module evaluation questionnaires) has indicated that this is more stressful than four-week blocks. Discussions amongst the wider lecturing team were held regarding how lecturers might adapt their course materials. Motivation to provide additional support to the students led to the provision of extra Q&A sessions each week. Moreover, to avoid overburdening lecturers and students, formative assignment submissions were cancelled.

The case study discussed here corresponds to lecturers A, B and C at the J-BJI teaching year-groups 1, 2 and 3 respectively during 2019/20 academic year, semester 2, teaching block 1. This case study should be considered in context with arrangements within HEI delivering programmes based within the UK.

3. Teaching delivery

Traditional lecture-based teaching was substituted with pre-recorded videos and the students had some flexibility in how these were viewed. Students had control over how they distributed their break time, the significant deadline being that viewing of a day's video(s) was to be completed by the beginning of the post-video live 'Q&A session'. For year-groups 1 and 2, Panopto was used to create pre-recorded video content. Alternatively, for year-group 3, pre-recorded videos were a combination of Panopto recordings of lectures delivered at the UoB in 2018/19 and new videos made specifically for the J-BJI. Some students noted that UoB recordings (of traditional lectures) were slower (in terms of pace of delivery of material) and easier to follow. The new videos occasionally omitted pieces of information in the theory, prompting students to pause their videos and fill in the blanks before referring to the full notes for clarification. The time difference between the lecturers (based in the UK) and the students (based in China) meant that potential delivery times of Q&A sessions were limited. It was necessary for these to be held in the UK AM / China PM (see Table 1).

Session (time in China)	Monday	Tuesday	Wednesday	Thursday	Friday
9 (17:35-18:20)	VS	VS	S (all)	VS	S (MAM/ICS)
10 (18:30-19:15)	VS	VS	S (all)	VS	S (Econ/Stats)
11 (19:25-20:10)	VS	VS		VS	
12 (20:20-21:05)	Q&A	Q&A		Q&A	

Table 1 - Generic timetable (subtle differences were present for different year-groups). VS: allocated video viewing session. Q&A: Question and answer session (optional attendance). S: Seminar (mandatory attendance). JNU-taught modules were delivered between 08:30 - 17:25 (time in China) in sessions 1-8. Note the 8 hour time difference with (UoB)-based lecturers.

The pre-recorded videos were organised by topic, sidestepping the usual constraints of lecture session times and providing more coherently organised course content (making revision easier). The allocated video viewing sessions on a given day provided students with structure but students had flexibility to modify the times at which they watched videos, provided they finished the content by the end of the final viewing session. The teaching block contained a total of twenty-seven 45-minute viewing sessions, in contrast to the typical twenty-four lecture sessions under normal teaching circumstances. Recordings were made using either Panopto, Zoom or some combination of the two.
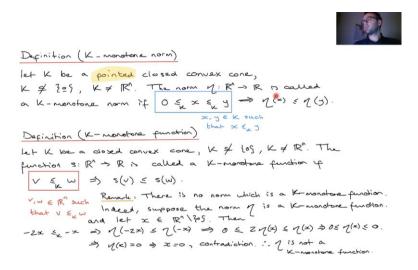

Figure 1 - Two streams viewed during a video recorded on zoom

Two video feeds were used in the recordings - one showing the lecturer and the other showing the on-screen content. Note that Zoom (see Figure 1) outputs an MP4 recording and so students see precisely as is seen in Figure 1, whereas Panopto (Panopto, 2020) outputs a webcast with distinct video feeds so that students have the choice to view both or one as they see fit.

It was a common opinion among the flying faculty lecturing team that students may find it difficult to adapt (considering the requirement to view up to 135 minutes of material over a 155 minute period) and so it was common practice to make the cumulative length of the videos, on viewing days, less than 135 minutes. Practically, there were potential issues: lecturers creating/uploading pre-recorded content in a short space of time (in practice, content was uploaded sufficiently early); students streaming content (content was not downloaded and so stable connections for the students was a concern); and disruption to live sessions (for lecturers and students).

4. Additional support

Following each viewing session was a 'Q&A session', included in an attempt to mimic the opportunity for students to ask questions after and/or during lectures. Lecturer A encouraged his students to use the hand raising feature in Zoom and ask questions using a microphone. If students had trouble with this, they sent images of questions via the chat function. Lecturers B and C both requested their students to ask questions via the chat function. Additionally, questions sent via email to the lecturers prior to the session were often discussed. Crucially, Q&A sessions were available to students to discuss their findings and inquire further when progress was difficult. Lecturers A and B used Zoom to deliver Q&A sessions and seminars. OneNote was used to capture hand-written content arising

from these sessions with all the aforementioned available via Blackboard. For lecturer C, Q&A sessions often served to fill in the missing details via group discussion and students responded positively to this introduction to a flipped learning approach (Lo, Hew, and Chen, 2017). Q&A sessions were not recorded, instead summary pdfs were produced with screenshots from the session.

'Seminars' on Wednesdays and Fridays were delivered via Zoom and allowed students to ask more general questions about their course, not necessarily restricted to one particular topic. Seminars were delivered via a mixture of lecturer-led and Q&A style sessions since discussions sometimes led to the delivery of additional programme specific content. Across all year-groups, the seminars featured some combination of: demonstrating solutions to typical examples; answering questions from the session; and addressing relevant questions received via email in advance of the session (lecturers A and B note that they received fewer student email queries throughout the teaching period than in previous years before the adoption of Q&A sessions). Attendance at seminars was mandatory and monitored using Zoom's attendance monitoring features. Seminars were recorded by administrative support staff (also present in seminars) and made available via Blackboard. We stress here the added value to the student experience of administrative support, which was available to students in real time, in particular at the beginning of the teaching block when students were unfamiliar with accessing, and engaging in, sessions.

Private office hours (1-1 sessions) were conducted each week. Students were invited to join a live video Zoom session where they could speak privately with the lecturer. It is the opinion of the authors that 1-1 sessions were not widely used with only a small number of distinct students using them (relative to the number of students using face-to-face office hours in previous years). On reflection, it appears that Q&A sessions are effective in addressing student concerns. However, it could also indicate that students are less inclined to speak 1-1 with a lecturer with whom they have had little to no contact with in person. Alternatively, this could be a result of language issues. It seems plausible, from past experience, that when several students have questions, the strongest communicator of the group would be elected to represent the group. This hypothesis fits with the experience of lecturer C who notes that although few students attended his 1-1 sessions, the students who attended typically had many questions.

5. Assessment

In previous years at the J-BJI, Möbius (DigitalEd, 2020) was used for computer-aided assessment, initially via closed-book class tests and, subsequently, via open-book assessments open for several days. Class tests were invigilated and lasted for 45 minutes. However, due to the remote delivery of teaching, Möbius assessments in this case study were open-book, not invigilated and accessible for several days. Open-book assessments were designed so that students should take roughly two hours in total (excluding revision/preparation time) to complete each assessment. This time limit (as opposed to a limit on the number of questions) was meant to keep assessments, to an extent, uniform amongst courses. Students were given one attempt at each assessment but were able to access each one on multiple occasions before submission. This decision was taken since student timetables were packed, leaving little time for preparation, in addition to the possibility of short-term and unpredictable loss of access to Möbius. Elements of randomisation were implemented in previous class tests and the present open-book assessments, whereby different students typically saw different instances of questions. The scope of randomisation was typically broader for year-groups 1 and 2 where a larger bank of questions existed from previous years. We reflect that in open-book assessments with longer deadlines (when compared to closed-book class tests), one can ask questions which are more complex and/or require a deeper conceptual understanding to answer. For example, inverting a 4x4 matrix is essentially as conceptually difficult as inverting a 3x3 matrix

but is more complex and, therefore, only appropriate when sufficient time is available. Perhaps more informatively, one can ask questions to assess deeper conceptual understanding (as outlined in Sangwin (2013)) in assessments open over large time periods when students have access to their notes and can be challenged to develop their understanding beyond the given course material.

Formative assessment was omitted since the group submission structure was deemed to be insufficiently supported in our remote-learning setting due to limitations (more difficult for students to collaborate effectively with each other) combined with the added strain of compulsory submissions. Practice questions were given out for students to use as they saw fit. Solutions were given out sooner than usual so that students could receive timely support during Friday seminars. Consequently, lecturers had concerns regarding individual feedback on deeper concepts. This relates to concerns about timely feedback and discussions on deeper concepts. Specifically, lecturers would not be able to see an individual student's attempts at proof and mathematical writing. There are concerns that some students became isolated, since group submissions were the only collaborative tool we employed prior to their removal.

6. Discussion

In the context of remote-learning, students having access to full typeset lecture notes allows them to engage with course material independently of the availability of other resources. This applies more-so when the VLE and related video resources can be sporadically unavailable (here, mostly due to evening/weekend maintenance).

Pre-recording allows us to create videos that can: be used in future years to supplement live lectures; provide resilience in the future if a lecturer is unable to teach at short notice; and enable us to experiment with flipped learning techniques. Practically, the risk that students could experience difficulty in accessing live lectures is mitigated by the inclusion of pre-recorded videos. With this in mind, recordings would typically be made available to students by the Friday of the week prior to the designated viewing session, so that they might exercise some autonomy in structuring their own learning. Note that in future, videos will be made available further in advance and the present deadline was mostly a function of the short-notice nature of preparations. Lecturer C will continue with the flipped learning approach in an attempt to move towards a research-motivated learning environment as the ultimate objective (Brew, 2006). For instance, lecturer C is planning for level H students in future years to be introduced to connections between Game Theory and Tropical Linear Algebra and, consequently, some contact time will be used to examine existing research problems distinct from the given course material. Through extra open-ended tasks, students will be able to explore special cases of unsolved problems and discuss their findings in small groups. Through this, research material will become a component of course content (Russell Group, 2020). Regarding remote delivery style, Bassili (2008) suggests body language is important in communications and so it is advisable that lecturers are visible in recordings. By using Panopto and Zoom, it is easy to accommodate this by displaying multiple feeds.

It is worth advising students on how videos should be viewed. We also note that students for whom English is a second language may experience difficulties in English-medium interaction (EMI) and so it is crucial to take pre-emptive measures to mitigate associated negative effects (Hu, Li, and Lei, 2014). There are two main issues to consider here: delivering content efficiently; and not speaking too quickly. For year-group 3, recordings were delivered at a sensible pace (pace of speaking) but students still felt that they were fast. What is clear is that international students learning through EMI may experience difficulties in keeping pace despite the best intentions of the lecturer. It is suggested by Jiang, Zhang, and May (2019) that complementary English language sessions can help to mitigate these effects by focusing on module-specific vernacular as advised by module leads.

Connection difficulties for lecturer C meant that one Q&A session had to be cancelled at short notice. This seems to be an inherent risk with remote-teaching and is a reminder that pre-recorded content has a significant part to play in the future of online teaching. Conversely, immediate feedback is the main positive in live sessions and thus finding a balance between live / pre-recorded content is crucial.

Panopto (hosted in China for better access speeds for students) had been used in the previous two years (with no major issues) to supplement course materials. During the semester it was used for all lecture content delivery (and accessed far more frequently than previously). The higher load caused unexpected problems for students and staff, which ultimately led to an upgrade mid-semester and lecturers resorting to using UoB Panopto as a back-up (with student access speed issues an inevitable consequence). These events should serve as a reminder to load-test IT infrastructure before deployment (ideally not during teaching blocks).

We reflect that Möbius, when used in conjunction with longer submission periods, posed fewer risks than the corresponding short submission periods in class tests of previous years. This is due to the longer time frames mitigating against short-term loss of access to the internet for the students. In the past, students were forced in these circumstances either to re-start a test (giving them an unfair advantage over their peers) or delay the start of a test. However, in addition, unnecessary stress was placed on students (accidental submission / temporary lack of access / confusion regarding deadlines) which, in our opinion, likely impacted negatively on the student experience. It is not necessarily inappropriate to run short time limit assessments, but conditions need to be favourable to run them in a way in which one has confidence in their effectiveness.

It was decided prior to the teaching block that not all Q&A sessions would be recorded due to privacy concerns. In practice, however, students often asked questions via the private chat function (not captured in recordings) and the questions were re-stated and answered publicly. It seems that recording Q&A sessions (provided students are notified) in future would be beneficial to students whilst preserving their anonymity. It was noted by lecturer C that students would typically not want to ask questions verbally or appear on video during 1-1 sessions. This is in comparison to our face-to-face teaching at the J-BJI in previous teaching blocks, when students appeared less reluctant to speak to lecturers outside of class. It is not clear what the dominating factors are here, some considerations are: the learning culture of Chinese students; language confidence; or asking questions online versus in person (Grimshaw, 2007). This is a problem since if students are completing a dual-degree, they should have opportunities to practise their English speaking/listening and gain in language confidence. It seems that there is a conflict between encouraging students' language development and what is most convenient to deliver mathematics sessions. There does not seem to be a conclusive answer yet as how to best strike this balance.

Q&A sessions were generally very active, with a high number of students attending (relative to the number of students who would typically remain behind for questions after a traditional lecture). Based on the level of engagement, the amount of lecturer-led support seems appropriate. Although lecturers may have viewed Q&A sessions as feedback mechanisms introduced to address the remote delivery setup, to a lot of students they were the most regular and timely feedback mechanism. We have ultimately taken the view that Q&A sessions should remain in both remote and non-remote setups.

Practically, it is often necessary in Zoom sessions with large numbers of students to mute audio and block video feeds. It can, therefore, be hard to gauge if a student has understood a given answer to a question, since visual cues often give an impression of comprehension. It is also common for students based at JNU to use WeChat (2020) over email as a mode of communication with staff in relation to their studies. For practical purposes at JNU, WeChat achieves parts of the functionality of email, Skype (Microsoft, 2020a) and Microsoft Teams (Microsoft, 2020b). However, while JNU

classify WeChat as being embedded in the VLE, the UoB classify it as a social media application and hence there is a conflict with UoB policy to avoid the use of social media for official teaching purposes.

This can lead to delays in students having their questions answered. To this end, administrative support staff often mediate questions directed at lecturers via WeChat. Cultural differences like this appear to exist in joint-institute setups but can be readily addressed.

Lecturer A reflects that due to the additional allocated viewing time, he elected to cover all content (including that usually left to the reader) and some students reacted negatively to this, suggesting it was 'too much'. Lecturer C felt a similar temptation to have a 'complete' video series which made producing too much content for the students a real (and unintended) possibility. It should be made clear to students which content is essential and which is optional - perhaps by storing optional content in a separate folder.

7. Reflections and conclusions

Content created during this case study will be used in future years, even if restrictions are lifted and face-to-face teaching is allowed to resume as usual. Lecturers A and B propose using the recorded material for content that is preliminary to the course or for non-examinable / technical content. This approach will allow students to engage more deeply in the material if they so wish. Lecturer C proposes to use the videos as the core medium through which the module content is delivered, in an effort to further progress a flipped learning (Brew, 2006) approach. Traditional lectures will become Q&A type sessions during which the most technical content can be discussed and students may compare their own ideas, allowing the allocated lecture sessions to discuss the relative merits and limitations of different approaches (though there are concerns with how well students communicate with each other when working together) (Grimshaw, 2007).

It has also been observed in all year-groups that the Q&A / seminar sessions are preferable to the more traditional 'examples classes' where the lecturer would demonstrate solutions or the students may work quietly and only occasionally ask for help privately from the lecturer / teaching assistant. An obvious benefit of this approach is the lack of repetition - questions may be asked privately but answered publicly. In relation, in the traditional setting students do not seem to like to be seen asking questions - Zoom appears to offer a way around this problem. Although not used in the present case study, discussion boards within Blackboard were adopted by other lecturers and seem to be an effective way of encouraging student interaction.

Overall, the experience has been mixed. Certainly, there are positives to take away, for example the Q&A sessions. These have been experimented with in previous years as a contingency plan in case of clashes and missed sessions but it is clear now that these should be a key component of our teaching setup. In future, these will replace a significant proportion of office hours. Also, our computer-aided assessment (CAA) allowed lecturers to cover a greater breadth of material by taking assessment outside of contact hours. Whilst CAA does have limitations in assessing higher level conceptual understanding, the lecturers noticed that this limitation is probably not as great as they initially expected (it is certainly possible to ask deep and difficult CAA questions). There are also, of course, drawbacks to remote-teaching. Face-to-face interaction is lacking and, as such, it is more difficult to get an impression if a student understands what one is talking about. It also seems to hinder students who are less confident to communicate verbally. It is not necessary to omit formative assignment in remote-teaching but its omission in the present case studies made it difficult to ascertain the competency of students' written proofs and other deeper concepts. It also limited the team-work / collaboration aspect of learning (although this was not helped by the physical distance of the students from one another).

8. Acknowledgements

9. References

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