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Blended Synchronous Learning Case Study: Veterinary Science

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This article describes a blended synchronous learning (BSL) case study program in veterinary science, including the physical space for the program. The student cohort in this program was diverse with students from more than ten countries and four continents. Traditionally, the program was only provided in a face-to-face (F2F) format, before moving to completely on-line during the early COVID pandemic and then to the current BSL format with most learners located in the F2F location. The 145 students in the program were broken into two classes with groups of up to eight students working together in each class with some students online and some F2F in each group. Tools used to aid the integration of the blended class included Canvas learning management system (LMS), Zoom, Padlet, Peerwise, 4D Virtual Farm and Poll Everywhere. Students were instructed on the use of the technologies on the LMS platform and in the initial case study as part of the cohort getting to know each other. The use of the BSL environment allowed all students to participate in each case study irrespective of their physical location and allowed production of review material. The technology allowed students to interact within and between groups well, albeit there were challenges with audio in small group Zoom breakouts, depending on the device being used.

Keywords: Blended synchronous learning, Case Study

Introduction

Blended synchronous learning (BSL) can be defined as "*Learning and teaching where remote students participate in face-to-face classes by means of rich-media synchronous technologies such as video conferencing, web conferencing, or virtual worlds." (Bower et.al. 2015).* There was little published information on the use of BSL within veterinary education until the COVID pandemic in 2020. Introduction of a BSL model reduced challenges with student travel and health to provide options for students to attend class either face-to-face (F2F) or via on-line methods to ensure students could access group learning.

This case study was undertaken by first year students in a Doctor of Veterinary Medicine course in 2022. The course is a postgraduate course with 145 students including both domestic and international students with slightly more than half the class domestic students. The class was split into two separate case study groups of approximately 73 students per group. The duration of each case study was limited to a maximum of 3 hours.

Description of the BSL learning environment.

This blended synchronous learning (BSL) class was held face-to-face (F2F) in the Collaborative Learning Centre (CLC) in the Western Edge Precinct at the University of Melbourne https://maps.unimelb.edu.au/point?poi=839103 and virtually wherever students were located, including locations outside Australia. The CLC had 18 table zones with space for eight to nine students per zone for a maximum total of 136 to 162 students, depending on seating density around each table. Each table had a large computer monitor and whiteboards for group collaboration (Figures 1 and 2). Students were able to display information from their devices via HDMI cable onto their local screen or alternatively use the whiteboard to share information with group members. The staff member coordinating the class could also show information on the main instruction screen only or override local table screens with the same content as shown in Figure 1. The set-up of the room enables groups to view the screens of some other groups while seated, or to move around the room to interact with other groups.

Figure 1: Photo of the F2F student environment

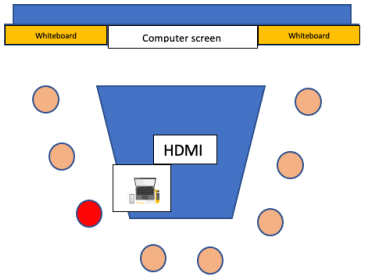

Figure 2: Schematic of Student Zone (eight seat configuration). Each student chair denoted by circle with one student using Zoom on computer (shown in red).

Students in the room could hear the instructor using the main screen with speakers placed around the room or via Zoom. Not all students were able to see the lectern at the front of the room, however the lectern area was shown via a camera in Zoom and allowed online students or those with minimal view to still see the presenter. The group Zoom session was recorded but stopped when students went into breakout rooms. Students transferred to Zoom breakout rooms using a single device at each table to avoid audio issues (shown by student in red in Figure 2). The student on Zoom connected via HDMI cable to the local screen to allow F2F colleagues to see colleagues on-line. Audio for the breakout Zoom came through the linked student device. All students were able to access University wi-fi to enable individual and group research on-line during the case study.

The main zoom session was run from the primary computer in the room while the session was recorded via a laptop (Figure 3). This doubled as a backup Zoom system and allowed a range of changes to be made “on the fly” without being obvious on the primary screen which allowed multiple different windows to be displayed. It was also possible to share the screen from the laptop if needed.

Figure 3: Staff presentation area showing main computer and room control hardware.

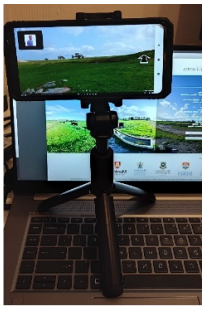

Figure 4: The remote online learner view logged into Zoom

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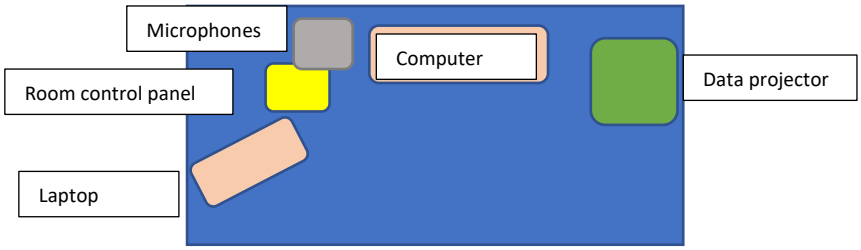

Figure 5: Schematic layout of the primary lecturing point.

Key Interaction Strategies

Students were divided into equal sized groups (seven or eight students) in morning and afternoon classes and remained in this group for all case studies during the semester. At least two staff were in the F2F session with one remote staff member online, primarily to support off-campus students. Up to two students in each group were not present in the room for the first few weeks of semester due to delays in international travel.

In the first case study, students were introduced to Zoom which was complimented by prereading Zoom instructions on the learning management system (LMS)-Canvas. Students were then introduced to Padlet with a link to a world map where they could place a flag with their city of residence the previous year. Zoom breakout rooms were utilised for student rooms to discuss what brought them to veterinary science. Students were then shown the functionality of Poll Everywhere and the link to be used during semester. A few icebreaker questions- for example "Do you have a pet animal? What sort of pet, if you do, or what you would like to have?" were asked in group breakout room space to help conversation. A demonstration on how to use the 4D Virtual Farm site was also provided for students as this was used throughout the semester. (Barber et al., 2016). Groups could decide how they kept notes, whether all students shared writing, or if one student acted as scribe for the group. During the case study, groups returned to the main room to discuss possible answers to questions as a complete class and compare responses - usually two to three times during the session. At the completion of the day's exercises, each group was required to submit three multiple choice questions (MCQs) from case

study or lecture material for the week via Peerwise (https://peerwise.cs.auckland.ac.nz/) to provide a bank of student generated MCQs for feedback to all students and for staff review. This method of sharing peer generated assessment review had been used successfully over several years in F2F format and has shown benefits for interaction and improvements in assessment outcomes (Rhind et al., 2012; Hancock et al., 2018). These interaction strategies continued over the twelve-week semester with varying use of the tools in each case study. Table 1 shows the learning activity design mapped to the BSL Design Framework (Bower et al., 2015).

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Table 1: BSL learning design mapped to the BSL Design Framework – modified from (Bower et al., 2015)

	Intended Learning outcomes	**Pedagogy**	**Technology**	**Logistics/Setup**
Presage (Design)	Understand the nature of global citizenship. Demonstrate ability to work in a group. Develop skills in critical thinking and research.	Allow students to understand where group members and classmates were from. Begin cohort development by understanding difference in groups. Work as a group using knowledge and research to critically review questions.	Canvas LMS, Zoom breakout rooms, Padlet. Canvas LMS, Zoom breakout rooms, Poll Everywhere. Canvas LMS, University library (online), web resources.	Setup Padlet link pre-class with world map. Ensure students could use Zoom breakout rooms. Setup Poll Everywhere slides prior with options for more "on the fly". Online instructions for use of library resources, complete early group exercises before moving onto group-based activity.
Process (Implementation)	Understand the nature of global citizenship. Demonstrate ability to work in a group. Develop skills in critical thinking and research.	Introductory scaffolding activities. Collaboration protocols established. Collaborative research activities.	Canvas LMS, Zoom breakout rooms, Padlet. Canvas LMS, Zoom breakout rooms, Poll Everywhere. Canvas LMS, University library (online), web resources.	Setup Padlet link preclass with world map. Setup Poll Everywhere slides prior with options for more "on the fly". Online instructions for use of library resources, complete early group exercises before moving onto group activity.
Product (Outcomes)	• The introductory activity of sharing where students came from encouraged significant discussion within the breakout rooms and allowed early group communication and collaboration for each group to continue across the rest of the semester. A significant percentage of students in each group attended virtually throughout semester due to protocols around COVID. Padlet continued to be used throughout the semester to review group feedback. • The use of PollEverywhere allowed students in the room and students attending virtually to get the same access to both submit and review material in real time. This helped generate discussion and questions around the room and provide feedback to staff on a regular basis. • Group work generally resulted in good overall outcomes. Staff moved between the 10 groups in the room to review where groups were up to and decide when all groups should return to the main room for a general discussion about suggested responses to problems that had been posed. Groups either allocated individual tasks to members to then bring back and discuss with the group or allocated sub-parts of each task. This process improved over the duration of semester in most groups.			

Key pedagogical strategies

Creating an awareness of students' geographic connection using Padlet helped build a sense of community in the case studies. This was deemed important given the diverse group of students including both domestic and international origin and rural and urban students (Baik, 2018). The early integration of student community has previously been shown to reduce some of the challenges of working within groups, especially when intentionally including a diversity of domestic and international students. Explicit time spent actively working together assisted early collaboration skills to assist group work throughout semester. In addition, a visual picture of where students are from around the world assists lecturing staff understand student backgrounds in the room. This subject reviewed animal production systems, which over 90% of the students had minimal to no background in this area, especially the international students who were unlikely to have Australian livestock experience at the commencement of the course. Throughout the semester a range of different livestock systems used in different areas of Australia, New Zealand and Internationally, aided by virtual farm enterprise examples in Australia and New Zealand were presented (Barber et al., 2016). This allowed students to virtually travel to a diverse range of livestock enterprises.

An important outcome from veterinary education is establishing a high-quality experience that develops students' ability to work in a team, given this is a key employability characteristic (Bell et al., 2021). Providing groups with contextual material and current research on a weekly basis helped to stimulate group dynamics and provided peer and subsequently staff feedback on outputs. One of the challenges of this method over the first month was that other subjects in the veterinary degree placed all online students in their own Zoom room- separate to those in the F2F classroom. This has the advantage of being simple to manage, however, it meant that students who started out on Zoom were not familiar with their group members when they arrived in the physical classroom. While students initially stated a preference for the model where all students off-campus were in a single Zoom room, there did appear to be good group interaction irrespective of when students arrived for F2F classes using this BSL model as they already knew their group members from earlier Zoom sessions. A survey was not undertaken at the end of semester to compare these different methods.

Lessons Learnt

What worked?

1. Students who were unable to attend classes in-person were able to work together with their group each week to achieve relevant learning outcomes. In addition to allowing students who were off-site to virtually attend the weekly case studies, it also produced a copy of the case study for the group sessions that could be used for later reflection or for students to review if they were ill. This blended approach increased students' ability to continue being part of their group, even when they were unable to attend in person. This is something that historically had not been made available to students.
2. Using Zoom and Zoom breakout rooms worked well to allow students to work together in their small group cohorts. This allowed students to either ask questions via Zoom chat if they wished, or for those in the room to ask staff directly as they interacted with student groups.

3. Having a staff member on Zoom and not in the room allowed for feedback on how the experience was working for online students. It also allowed the online staff member to respond to any groups in the room who either couldn't gain access staff or who preferred to contact via chat. This was an efficient use of staff resources although generally not the students preferred primary source of contact when located F2F.
4. Using online tools such as Poll Everywhere and Padlet worked well for students who were either onsite or offsite as results were shared simultaneously on all group screens or devices being used by the online students. Results from both these surveys were then shareable after the session either direct via the link or in the subject recording.
5. Using virtual enterprises such as the 4D Virtual Farm allowed all students to visualise enterprises through time and space when visiting in person was not possible. This also allowed reflection on enterprise "visits" and received positive student feedback.

What problems were encountered?

1. While it improved over the course of the semester, achieving high quality audio in breakout rooms was sometimes challenging, depending on the audio quality in the device used for the Zoom breakout room. For each group, one student used their microphone for the group to avoid issues with multiple microphones and audio feedback.
2. In the first few weeks of semester other subjects in the veterinary course were placing all students who were yet to arrive on campus into off-campus Zoom groups and running them separately to the F2F groups. Overall, this generally resulted in better audio quality however these groups were not the final groups the students worked in when they arrived on campus. This meant that some of the group interaction was lost or reduced. Initially this was the students' preferred method, however, keeping students in the same group all semester may have improved group function and cohort experience as students were more familiar with one another by the end of semester. In the first few weeks, students voiced a preference for being in a F2F session. Students in this class were not surveyed at the end of semester to review their preference.
3. Changes in staffing meant it was challenging to staff classes optimally. The ability to have some staff off-campus allowed extra staffing that wouldn't have been available on-site as well as better supporting the online learners.

What will you modify next time?

- Using a designated microphone for each table might assist the ability for students off-site to feel more connected with the group. All software trialled worked well, so would not be changed.

Recommended Resources

The physical space where students were located for F2F teaching was an important part of this BLE. The CLC was built immediately prior to the pandemic and was excellent for the purpose of the BLE which assisted a positive outcome. Adequate space between student tables meant that groups could discuss case studies without noise impacting groups at the next table significantly. The ability to display screens to all tables as well as

excellent audio in the room facilitated good communication, noting the challenges of audio on each table as that was not part of the room design.

Having a staff member outside the main room to manage on-line students and provide feedback to the in-room presenters was very helpful to ensure that on-line learners were never forgotten and that simple things such as turning on zoom recording wasn't forgotten. Similarly, having adequate staff to support the students in the room continues to be an important resource to maximise student learning and engagement.

Conclusion

While further work is needed to improve sound quality for learners in the virtual environment, the overall blended learning experience in this subject was positive. This is particularly important given that this followed a significant period of solely online teaching for both students and staff. In addition, it allowed students who were not able to attend in person due to COVID restrictions to do so, or for any students who were ill to review recordings of the session later. Historically, there would be no recording for this class and the student would need to rely on the materials gathered by colleagues to catch up. Students were also then able to access the recordings for exam study given all content was examinable. Irrespective of whether blended learning continues, a number of tools used in this example will continue to be integrated in teaching this subject to enhance student learning experiences.

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