

# **A Team-Teaching Approach for Blended Learning: An Experiment**

Sophie McKenzie<sup>a\*</sup>, Rachael Hains-Wesson<sup>b</sup>, Shaun Bangay and Greg Bowtell<sup>c</sup>

<sup>a</sup>*School of Information Technology, Deakin University, Geelong, Australia;*

<sup>b</sup>*Work-Integrated Learning Hub, University of Sydney Business School, Sydney, Australia;*

<sup>c</sup>*School of Information Technology, Deakin University, Geelong, Australia.*

\*corresponding author: Sophie McKenzie, ORCID: 0000-0001-5803-640X  
[sophie.mckenzie@deakin.edu.au](mailto:sophie.mckenzie@deakin.edu.au)

Blended learning is often viewed as a teaching mode that integrates a combination of online interactive activities with face-to-face learnings. This includes a mixture of different types of teaching and learning techniques, and Information and Communication Technologies (ICT) tools. In this study, we undertook an experiment to ascertain what constituted a practitioner-based approach to team-teaching for blended learning. The experiment occurred during one teaching period (11 weeks) at an Australian University where the classroom teaching experience was accessed by students and teachers across different geographical locations, using ICT. During the experiment, we completed individual and collaborative reflections, utilised an online survey to elicit students' perceptions about our team-teaching practice and critiqued the literature on blended learning. Qualitative analysis was conducted for each data source, revealing several key themes, which were: 1) skills, 2) student, team-teaching and teacher roles and 3) the role of ICT. This study explored these themes in detail, showing that when using ICT, specific communication processes build student and teachers' confidence as well as facilitating trust between those involved in providing a blended classroom experience. This in turn,

contributes to the flexible use of ICT tools, offering opportunities for teacher and students to participate in variety of class roles, interacting via online, face-to-face or blended methods. Overall we found that to assist with setting-up and facilitating teach-teaching for blended learning, it was important to provide role clarity, an agreed-to approach for classroom communications and purposeful integration of ICT for the teaching team and students when failure occurred.

**Keywords:** team-teaching, blended learning, mixed methods, information and communication technology, scholarship of teaching and learning

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## **Introduction**

In this study, we unpacked our practice to help articulate a set of recommendations for team-teaching that would benefit the wider educator community. We used collaborative and self-reflective mixed methods as well as eliciting students' perceptions of our team-teaching endeavours. The insights presented here are context specific with the results of the study assisting us to answer the following research question:

What constitutes a practitioner-based approach to team-teaching for blended learning?

## **Context of the Study**

Students participated in eleven multi-locational classroom learning experiences (via different on-campus locations as well as online learning situations for face-to-face

lectures that allowed ‘live’ online access). The cohort consisted of second year, undergraduate IT students at an Australian University. During the experiment, we used ‘live’ streaming technology to allow students to access a multi-locational classroom environment, encouraging the teaching team and students to participate from multiple locations via face-to-face, online or blended. Similar to Fletcher and Bullock (2015), Crawford and Jenkins’ (2017) research findings, we designed the learning experience to ensure that we actively supported student learning with the use of several online interactive tools. For example, our team-teaching format included the following key elements (for both students and the teaching team): 1) identifying different types of learning needs, 2) clarifying the skills and skill-set levels required and 3) undertaking preparation meetings and prior to delivery, such as synchronous and asynchronous technology to help mitigate challenges and communication constraints (see Figure 1, for an example of the live streaming tool we used).

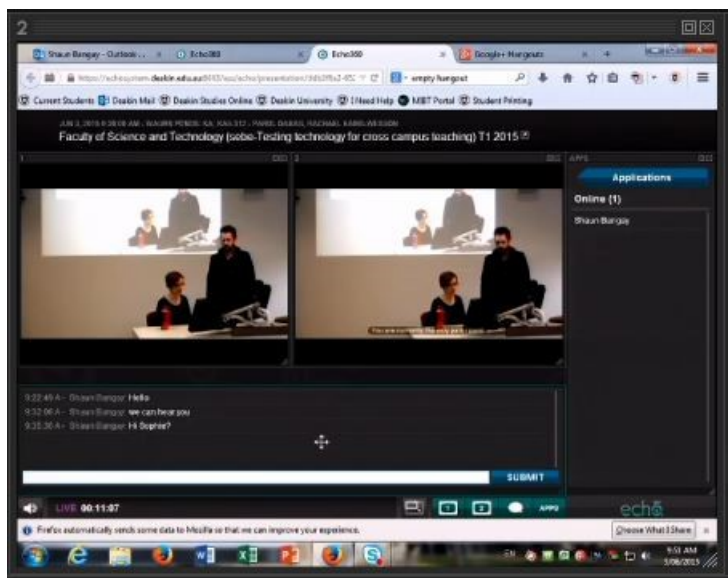
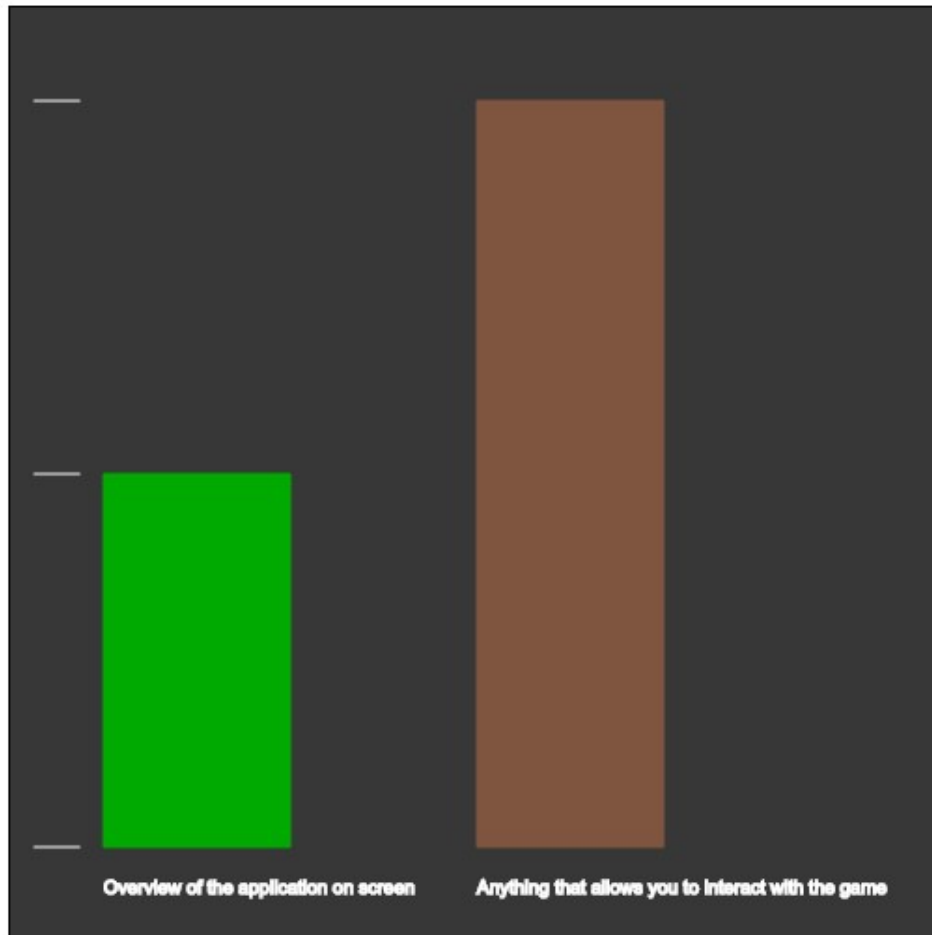


Figure 1. Live Streaming Tool used in our experiment

Our team-teaching practice included a combination of multiple types of content delivery (i.e. videos), various learning activities (i.e. polls) and discussion forums (i.e. live chat feeds), each being conducted via face-to-face, online or blended (see Figure 2, for an example of an online interactive learning activity we used to support the live streaming).

## What do you think is an interface?



Anything that allows you to interact with the game

Overview of the application on screen

### Vote Aggregate Configuration

- 

Figure 2. Example of a learning activity in our blended learning classroom.

Three team-teaching members were involved in every aspect of the blended learning classroom design and delivery. The second author acted as a critical friend, observer and

co-researcher for the experiment. When the teaching-team conducted a class, a teacher would attend the face-to-face lecture theatre that had a video conference connection with the second teacher co-delivering content via a geographically separated face-to-face lecture theatre. The remaining teacher would then facilitate the online students to help them connect with the face-to-face cohort and contribute to 'live' discussions with on and off-campus students as well as the teaching-team. The learning activities included the following:

1. Online voting: Pre-determined and on-the-fly polling/questions, conducted across all locations and modes. Both teachers and students could add poll options. For example, students could answer questions posed by adding answers to the poll options, supporting answers provided by other students, or by adapting their responses during the development of topics and scenarios that were being discussed and described by the teaching team or students no matter their mode or location.
2. Video/audio demonstration: Synchronized playback of video clips or audio clips sourced from YouTube across all locations/learning environments and modes. This was used to manage the local display of media for demonstration purposes and to avoid lag and quality deterioration between geographical located venues. Media were used to expand on topics presented by teachers but also as sources from case studies for critical evaluation of design and decision making for the set topic.
3. A countdown timer: To enable separated activities (such as classroom questions and answers) to be synchronised. This was used to manage breakout sessions in the individual venues (and online), for example where direct interaction occurred

between teachers and students around topics related to the subject, such as physical objects, storyboarding or sketching of designs for interactive sessions.

4. Image click: Pre-loaded images provided relevant content that could be clicked on by participants. Each click represented a point of interest in the image, often indicating 'hot spots' for student discussion. The image could be a chart or set of axes where students made a quantitative judgement relative to criteria or pinpointed a mosaic of images relevant to representing embodiment of abstract concepts, which was a key concept for the unit.
5. A discussion/chat board: A chat board was available and open for participant contribution during classes. These were synchronised and occurred across different locations and learning environments. This was used for student-to-student and student-to-teacher discussions. Additionally, this was utilised for facilitating detailed polling, but also as an opportunity for students to contribute to the classroom content, ideas and images, such as sharing of internet links and discussion points for set topics

## **Literature Review**

Besides the technological advances of the 21 century, leading to mass disruption of blended learning practices, there has been another disruption. The global health crisis. Teachers have no choice but to place team-teaching for blended learning at the centre of technological challenges, requiring teaching teams to re-thing their practice. Prior to COVID-19 crisis, the deployment of team-teaching for blended learning was often used, but perhaps not globally or always. The integration of a high level of ICT affords multi-modal, collaborative and poly-synchronous modes of interaction between teachers and students. Additionally, blended learning creates vast opportunities for on-campus and

distributed learners (off-campus/blended learning) to interact with teachers, students and industry (and in a range of parallel learning spaces, platforms and times) (Baeten & Simons, 2014; Crawford & Jenkins, 2017; Eustace, 2008; Garrison & Kanuka, 2004; Miles & Mikulec, 2008; Oblinger, 2012).

However, there is a modest amount of research that showcases educator-practitioner innovation via experimentation for exploring team-teaching for blended learning (Bair & Woodward, 1971; Benjamin 2000; Fletcher & Bullock, 2015; Shaplin & Old, 1964; Wilson & Martin 1998). When scholarly studies have centred on team-teaching, these have focused on pedagogical 'best' practice, benefits and methods (Bair & Woodward, 1971; Buckley, 1999; Crawford & Jenkins, 2017; Letterman & Dugan, 2004; Shaplin & Old, 1964), discipline-centric approaches (Jang, 2008) or secondary learning and practice (Crawford & Jenkins, 2017).

There have been limited studies on how team-teaching is beneficial for the student learning experience, particularly when it is conducted through the dynamics of teacher-to-student (Benjamin 2000; Wilson and Martin 1998; Johnson and Smith 2000) and teacher-to-teacher interactions (Letterman and Dugan, 2004). With others noting that team-teaching practice is important, but only when it is shared via teacher expertise, reflective dialogue or highlights areas for improvement (Chang and Lee, 2010; Crawford & Jenkins, 2016, 2017, 2018; Jang, 2008; Eustace, 2008; Garrison & Kanuka, 2004; Miles & Mikulec, 2008; Oblinger, 2012).

On a closer review of the literature, currently, there is minimal research that focuses on how to best implement team-teaching approaches for blended learning (Wivell & Day,



2015; White et al. 2010), the showcasing of tested theoretical frameworks for improving practice (Delgarno, 2014; Driscoll, 2003; Torrissi-Steele, 2011; Wivell & Day, 2015), the use of certain technologies when team-teaching for blended learning (Bonnk & Graham, 2012; Hains-Wesson & Tytler, 2015; Newby, Stepich, Lehman & Russell, 2000; Horn & Staker, 2015; Torrissi-Steele, 2011) or tested learning frameworks (Fletcher & Bullock, 2015, Kearsley & Shneiderman, 1998; Torrissi-Steele, 2011).

There is an urgent need to undertake additional practitioner-based research experiments that are student-centred, exploring the mechanics of team-teaching for blended learning. This call to action is not only important, but it is urgent, because collectively, teachers are being required to quickly move from face-to-face to online delivery, to re-think team-teaching processes, blended learning instruction and to make sure that they are meeting the needs of a variety of learners through different contexts while integrating a diverse range of ICT tools and platforms (Crawford & Jenkins, 2017; Porter & Graham, 2016).

To better prepare and successfully implement team-teaching for blended learning, considerable effort from the teaching team, individual members and students are needed. To help define an effective approach when team-teaching for blended learning, and which suits both students and teachers as well as considering ICT considerations, an agreed-to framework is recommended. This framework needs to include a range of reasons for recommendations, because not only does a teaching team expect its members and students to be familiar with multiple ICT tools and platforms (Baeten & Simons, 2014), to be efficient with a wide range of communication strategies (Graziano & Navarette, 2012), but to also internally manage conflict and group dynamics, especially when ICT fails

(Letterman and Dugan 2004; Porter, et al. 2016; Dalgarno 2014; Eustace 2003; Tajino & Walker, 1998).

## **Methodology**

To answer the study's research question, we utilised a qualitative, multi-phase methodology as suggested by Ryan and Bernard (2016). This methodology was chosen, because we required an approach that would allow for a cyclic/iterative nature for qualitative inquiry while also allowing for an iterative approach to the data collection and analysis. We chose this methodology because as Greene et al. (1989) articulates, iterative methodologies allow the research to be undertaken in a more flexible manner, providing a responsive approach to exploring a phenomenon of practice. Additionally, we chose this type of methodology because it allowed for the use of multiple self-report data gathering processes, which then became useful when the team met regularly via the collaborative (critical friends') meetings to "...look at texts read, experiences had, people known, and ideas considered" (Loughran and Northfield 1998, 236). Further, it allowed the teaching team to purposely reflect and redesign the team-teaching for blended learning framework, and while it was in operation; due to the sharing of ideas, thoughts, opinions and concepts arising throughout the experiment. This methodological process has been tested and widely used (Hains-Wesson & Tytler, 2015; Hains-Wesson and Young, 2017). We therefore, felt confident to incorporate a similar methodology; as we viewed ourselves as members of the same community of scholars who engage in qualitative and self-study research for educational investigations when undertaking experiments. Ultimately, we desired a way to understand and improve instruction that was repeatable (Hains-Wesson & Tyler, 2015) for others to repeat. Finally, we undertook the research in accordance with

the National Statement on Ethical Conduct in Human Research, which was approved by the University's Faculty Ethics Advisory Group.

## **Methods**

We collected data from three, qualitative self-reporting mixed method sources, which were: individual and collaborative self-reflections and observations that were transcribed or recorded (N=33) into a Word document, an extensive review of the blended learning and team-teaching literature (N=36 papers) and students' responses from an online survey that was conducted post- teaching (N=15).

## **Data Collection**

In the following section, we describe how each data collection was undertaken.

### ***Individual and Collaborative Self-Reflections***

We conducted and recorded thirty-three individual written journal self-reflection notes and eight collaborative reflections. The meetings were recorded before being transcribed into Word documents for future analysis. The data collection process helped us to focus our attentions on critically unpacking our team-teaching format, preparing for our blended learning classes, and monitoring and discussing risks or challenges for problem-solving. The regular collaborative (critical friends) meetings included our feedback on what we observed, provided the teaching team with insights from the notes we took when observing students' engagement and while we were actively team-teaching. For instance, we discovered that the meetings allowed for the exploration of multiple ideas that refined our theoretical approach to team-teaching, and inducing deep contemplation about what we believed constituted effective team-teaching and why. We therefore purposely designed the critical meetings to align to Fletcher and Bullock's (2014) self-reporting

methods for critical friends' meeting, reflecting upon the discoveries made and learning from one another.

### ***Reviewing Key Literature***

During the collaborative meetings we made a concerted effort to review and provide insights to share with one another, noting any key findings from the literature about blended learning and team-teaching. Initially, the literature findings assisted us to design and refine our preferred blended learning practice as well as to unpack and re-position our team-teaching philosophy. For example, during the experiment, we regularly critiqued pertinent findings from the literature review, which helped to provide us with additional reflections on different theories. This part of the data collection process influenced our decision making processes, such as Dalgarno's theories (2014) about the importance of poly-synchronous learning, Driscoll (2003), Torrisi-Steele (2011 and Wivell and Day' work (2015) in terms of a different blended learning frameworks and lastly Fletcher and Bullock' (2014) perspectives on best practice for online teaching. The key literature used in this research is shown in the reference list of this paper.

### ***Student Survey***

We developed and initiated an online survey to elicit students' perspectives on our team-teaching practice. We believed it was important to include students' perspectives on our team-teaching process for this study. The data helped ensure that we answered the research question, but also kept in mind the need to provide a student-centred blended learning experience (Torrisi-Steele, 2011). The online survey was used to illustrate students' view point and had been tested for validity in a previous study (\*). The survey questions were designed to ensure students would rate particular blended learning

activities before being asked to respond to open-ended questions about the details of those activities. The survey questions provided an opportunity for students to express their views on the role of online technologies for this study. We recruited participants by placing an invitation to be involved in the experiment onto the unit of study's learning management system. We also sent individual email invitations. We invited eighty students to participate in the study. We received a modest participation rate (N=15).

### **Data Analysis**

The process for data analysis was iterative, and we conducted it at the individual and collective level. We coded and re-coded each data source multiple times as individual research members and also collectively. We undertook the coding and recoding of the data over a number of phases until we had mutual agreement for the final themes. To aid in providing consensus, we completed the following steps. First, we reviewed the data individually before collectively defining an initial set of themes, which formed a base coding structure. Second, we purposely pawed through each data source, using an eyeballing technique suggested by Ryan and Bernard (2003). Third, we used coloured pens to highlight individual coding and collectively re-coded each text. Fourth, we provided notes and reflections on why a colour was used and for a particular part of the text while answering the following questions:

1. What is this text about and how does it relate to team-teaching for blended learning?
2. How does this piece of text differ/compare to the preceding statement?
3. How is the statement of text different to our experience as teachers when team-teaching for blended learning?

4. What does this text remind us of when team-teaching for blended learning?

Fifth, we collectively described themes and coding relationships based on the first four stages of the analysis process. We completed this part of the data analysis via multiple group discussions before we refined and updated the theme definitions. Finally, we completed regular group re-coding sessions to enable comparison of the initial coding activities that had resulted from the emergence of themes for final consensus. The outcomes of our data analysis and the pinpoint of the themes is presented in Table 1.

It is important to note that the cyclic and iterative data analysis process was important, because we knew that the modest survey responses could not answer the research question alone, and despite the varied and significant insights that we had found from the mixed data sets.

In Table 1, we provide an example of how we progressed through the data analysis framework by illustrating a data source that informed our theme definitions. We completed this process during each stage of the data analysis process. For instance, column two shows how we outlined the key insights drawn from the data analysis, with the final themes being shown in column three. Therefore, a theme that we found to be a key outcome from each iteration of the analysis process was highlighted with an \*.

[Insert Table 1 here]

Table 1. Data analysis outcomes from three phases

## **Results**

In the following section, we elaborate on the themes that arose from the data analysis coding and re-coding process, which were: 1) skills, 2) student, team-teaching and teacher roles and 3) the role of ICT.

## **Themes**

### *Skills*

An initial key theme that we discovered was to acknowledge the skills most needed for team-teaching in a blended learning classroom. This theme centred on the importance of communication skills for effective team-teaching as well as developing a blended learning classroom philosophy that builds trust between participants. This can be difficult to do, because as expressed by Porter et al. (2016) and White et al. (2010) effective selection processes for teaching-teams are not always conducted. Teaching teams are often not derived due to the level of skills needed for blended learning experiences. Rather, teaching teams are brought together due to workload requirements or teachers' availabilities. Yet, when teaching teams have complementary skills and an established philosophy, the blended learning classroom can be a successful mix of unique teaching styles, as discussed in one of our collaborative meetings:

“There’s a concurrency of approaches with no clear line drawn between the two, enabling the teachers to weave each into the other if opportunity permits”.

A key skill required to support team teaching in a blended learning classroom was therefore communication. Our blended learning classroom provided different channels for communication to occur between teacher-to-teacher, student-to-teacher and student-

to-student. Diverse communication skills were therefore crucial for our team-teaching approach as well as interpersonal skills for the facilitation of online, face-to-face and blended communication activities. The variety of communication methods demonstrated increased opportunities for participation, as noted from the student survey:

“...having direct communication with my peers and lectures [online] allowed me [to] ask the question at the point when data is fresh in my mind and the participants” (a student response to our teaching team method).

During the experiment, we also discovered that there was a need for the teaching team to closely monitor online behaviour. As described in a different collaborative meeting:

“Unfortunately some students were very ‘chatty’ in the discussion, and sometimes used language that could be seen as offensive.”

The teaching team had to be mindful of ‘over-policing’ the student-to-student interactions, otherwise reduced student contribution was noted. To avoid impacting on student engagement in the online discussion, the teaching team purposely instigated the development of mutual and shared understanding around team teaching, expressing our developing philosophy with students, creating trust between all members in the classroom. As described during another collaborative meeting:

“I think developing trust is really important, it’s how you start. Then you can get more relaxed and get more serious later”.

This trust resulted in a more active blended learning class, as noted:



“Students have stated that we increased their enjoyment of the lecture, increasing students’ attentiveness and concentration”.

### **Student, Team-teaching and Teacher Roles**

The second theme that emerged was student, team-teaching and teacher roles. We found that when we provided a team-teaching approach that integrated a dynamic collection of ICT tools and platforms that different and similar student and teacher roles became apparent. To achieve the dynamics of teach-teaching in a blended learning classroom, clarification of roles (for both teacher and students) was needed or there was a risk of assuming a perceived understanding around expectations, which impacted the team teaching approach employed in the class.

During our experiment we found that we needed to maintain a ‘leader’ role for the teacher who was operating at the main, on-campus (located) classroom, as they were required to present relevant content and provide overall class management. This role often provided the main form of content presentation, which resulted in complexity as they also needed to interact with the online activities to help create a meaningful classroom experience. Therefore, to facilitate team teaching, the teaching team decided to continually switch roles to allow for ‘tagging’ of the ‘leader’ role and at certain times:

“While one staff member [leader] is engaging with a room [students], the other teachers can take over the online discussion moderation getting a chance to catch up with the state of play” (comment from an individual reflection).

This resulted in the teacher role becoming mixed, one of content provider as well as online contributor:

“Do we have a distinctive teacher role in this or is everyone just part of the gang?”

Letterman and Dugan (2004) (as well as others, see Wilson and Martin, 1989; Benjamin, 2000; Johnson and Smith, 2000) have argued that the dynamics of teacher-to-teacher interactions alongside teacher-to-student relationships can enhance the student learning experience. In our blended learning classroom, it was observed and commented on that teaching staff participation in the classroom varied week to week, from being more active across the various content and activities, to being more passive and ‘observer-like’ for the online discussions. As commented during one of our collaborative meeting:

“playing an observer role in the online discussion I have been observing students – and I have seen some things. There seems to be a level of comfort for students that students don’t always have to do in a lecture”.

Over time, we also found that students adopted various roles and during classroom time. We found distinct student role formations around the class activities, such as students taking on an ‘active contributor role’ or acting as a leader during the online discussions by answering teacher-posed questions or providing their peers with their thoughts and ideas. Student would also switch to an ‘observational role’. Students’ roles were becoming similar to ‘evolving experts’ as they actively expressed themselves, sharing ideas about theory, offering examples of their learning to the teaching-team and peers:

“...students (myself included) to benefit from asking questions without interrupting the lecturer. And, it meant that other students could also chime in with their opinions and

thoughts to particular questions even when the teacher had moved onto a new topic” (a student response of our teaching team method).

These diverse student roles occurred for both located (on-campus) and online (off-campus) students, and it was often difficult to distinguish between those participating from the lecture venue and those online:

I...“was not able to distinguish off-campus students from those in the class by their online personas or interactions” (comment from an individual teacher reflection).

Driscoll (2003) and Torrissi-Steele (2011) point out that effective blended learning approaches require flexibility in the way in which people engage with learning experiences. However, during our experiment, we discovered that the concept of role was not always successful if too much flexibility was provided. Providing role clarity for the teaching team minimised risk, and also prepared students for their role and prior to delivery. We clarified our responsibilities as a teaching team and what were our expectations for the team but also for students, especially when using technology. This decision helped us to define our roles and to assist students to understand their roles and its importance for enabling classroom interactions.

### **The role of ICT**

The final theme was the role of ICT. This theme focused on how ICT enables the teaching team to provide a successful classroom experience, to mitigate technology failure and facilitate two-way communication with students, promoting active learning through interactive concepts (as described in the context of study section). Students appreciated our ability to control the ICT source/media streaming, as this provided the class with

synchronisation across the media streams. It was during this part of the experiment that we began to see ICT as having its own role within our team-teaching approach. For example, students found that the ability to share hyperlinks during the online chats also allowed for the sharing of images and media presentations in real-time. This enabled students to take on board new content, which was enabled by ICT. This in turn provided student engagement and enthusiasm during class:

“...we noticed competition over concept choice when decided by student vote. This seemed to generate enthusiasm, resulting in online posts” (a teacher response to our teaching team method).

The teaching team also noted that the students’ views on ICT played a negative role for blended learning. We observed and noted many frustrations with managing and repurposing standardised ICT equipment into a distributed teaching setting that would meet diverse learners’ needs. This was particularly apparent during the classroom planning phase (prior to delivery) with the occasional adjustment to ICT settings being required:

“It is significant that the live stream now only provides slides (poorly) and audio (also issues) and the teacher (leader) had to hold the lapel microphone at a certain angle and about 2cms away from the mouth for it to be audible quality for the live stream” (a teacher response to our teaching team method).

Additionally, the findings from the student survey suggested that there was a downside to our team-teaching approach due to poor ICT audio and video quality, creating

additional challenges for connecting and collaborating between campuses, online or face-to-face. As the following student comment suggests:

“Better support from the technical department to ensure that the audio signal between campuses is sufficient.”

In addition to poor audio and video quality, the live streaming system that we employed could not mix audio streams and also had restrictions on teacher/student awareness of each other due to limited video sharing between participants. This was particularly relevant for those students whose connection was reliant on the live stream to participate in the classroom activities. Therefore, when students viewed ICT as a negative role within our team, it was the teaching team who were impacted, because we could not resolve the issues due to technological issues, such as a broken microphone.

To help combat technical issues, multiple and informal communication channels were invaluable. This allowed the teaching team to make sure that no student in the classroom (on-campus or off-campus) was left behind, especially in the event of an online link failure. Students also suggested that the technological limits were due to them not being equipped with (or not using) devices (in class), preventing them from participating with online peers. To enable those in class without a device to contribute, the teacher made a concerted effort to use the room microphone, which some students found uncomfortable, because they did not want to speak ‘live’ into the microphone.

Acknowledging that ICT plays a significant role in the classroom, not just as a medium for communication but as a construct for activity, enabled the teaching team to work within the constraints and nuances of providing a blended learning classroom.

## **Discussion**

Team-teaching for blended learning can provide opportunities for increasing classroom participation and interactions for teacher-to-teacher, teacher-to-student, and student-to-student interactions (Letterman & Dugan 2004). However, much effort is needed to ensure that students have the skills, understanding and confidence to take on a role within a team-teaching framework. For example, in this experiment, students were encouraged to supplement the learning materials with examples of their own and to discuss points sourced from real-time online research during their classroom experience. The variety of interactions that occurred in the blended learning classroom required students to also understand the team's roles. This in turn, opened students up to the need of being flexible, trusting and communicative.

We discovered that when we integrated teacher participation for blended learning that combined everyone's roles and understanding around individual and group skills that students were quick to also adopt to multiple roles, such as spontaneously initiating an online discussion, playing the role of a leader or an evolving expert. Further, our analysis discovered that multiple and informal communication channels ensured flexibility, enabling participation for both teachers and students, however, this also required some facilitation by teaching staff to ensure communication remained respectful. The purposeful integration of ICT around learning activities promoted student participation, and provided avenues for communication not normally available in a face-to-face

classroom. ICT also had to be flexible to adapt to the evolving classroom experience, particularly when failure of technology occurred. Understanding these failures, and providing a work around, was an essential skill requirement of the teaching team.

Overall, in our team-teaching approach, when setting up and conducting our blended learning classroom it was important to acknowledge and understand teachers' various teaching skills, to provide role clarity on classroom participation and to set-up the different types of communication pathways (for the teaching-team, its members and students). To achieve these requirements we discovered it was important to articulate an agreed-to approach and early; but not just for teaching teams but also students, particularly in regards to communication.

## **Conclusion**

This study investigated a teaching team's preferred approach to blended learning, capturing their practitioner-based process. During the experiment, the blended learning classroom was 'live-streamed' to allow connection from multiple locations, and was supported by online interactive tools and blended learning opportunities available to all participants.

To assist with answering the research question for this study, insights were derived from a mixed methods process that included individual and collaborative self-reflections, a critique of the blended learning and team-teaching literature, and eliciting students' responses from an online survey. The results highlighted our team-teaching philosophy of practice, which included: 1) understanding the skills required for the teaching team,

individual teachers and students, 2) teacher and student roles, and 3) the role of ICT. This process was best achieved by explaining the teaching team approach as well as expectations clearly with students (and not for them) and prior to the learning taking place, because now more than ever, multi-modal and poly-synchronous modes of ICT delivery and interaction, with the opportunity for located and distributed learners to interact with teachers, students and industry (and in a range of parallel learning spaces) are becoming the norm (Baeten & Simons, 2014; Crawford & Jenkins, 2017; Eustace, 2008; Garrison & Kanuka, 2004; Miles & Mikulec, 2008; Oblinger, 2012).

### **Limitations**

A major limitation was the number of participants for the online survey, which was modest. Additionally, the study did not include different types of teaching and learning contexts, diverse disciplines, large student classes or outcomes post-experiment. A further limitation of the study was that the researchers were also part of the experiment, acting as key observers when delving deeply into the nature of the team-teaching for blended learning during delivery. While every effort was taken to validate the data and minimise biases, the choice to integrated self-reported data gathering processes may have influenced the outcomes of the study. Nevertheless, conducting future research in the area of team-teaching for different teaching and learning contexts, such as executive education or with large student cohort numbers as well as actively testing the findings presented here and for different contexts, would be of great benefit for the higher education community.



## **Future Directions**

Recent research by McLean, Graham, Suchet-Pearson, Simon, Salt & Parashar (2019) have included students as co-authors and participants in the research on blended learning. We agree with this findings as this approach to practicum-based research endeavours has enriched the data and the way in which students' voices are heard in the Scholarship of Teaching and Learning literature. Future work in this area, that is, to include larger numbers of student voices, when investigating team-teaching for blended learning would be a highly recommended future direction. In turn, this would further allow students to be co-authors and co-researchers about how they best learn and why. Other future research areas would be to conduct longitudinal studies that focus on ICT as a key facilitator, role for teaching-teams and how this role transforms and impacts the student learning experience, especially when ICT fails.

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## **Declaration of interest**

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