ATTENTION UNDER PRESSURE: THE IMPACT OF TECHNOLOGY-ENHANCED LEARNING ENVIRONMENT ON TEACHER PRESENCE

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Abstract

This paper evaluates the use of a blended synchronous learning (BSL) approach in a university setting by specifically focusing on its impact on academics. Through qualitative interviews and reflexive thematic analysis, our findings suggest that the increased number of activities teachers are asked to simultaneously perform in this environment places more pressure on their attention system, which negatively impacts their ability to be present. We suggest that this learning approach alone, even when supported with extensive professional development and pedagogy, may not be the most effective solution for improving teacher presence and student engagement in a classroom.

Background

Federation University is a large regional university with remote campuses across Victoria and Queensland offering blended, on-campus, and online learning to students in Australia as well as international partners. Within its student cohort, about 80% are first in family (i.e., the first member of their family ever to attend university), 75% come from regional or rural areas, and 75% come from one or more of the equity groups (such as Indigenous; low socioeconomic status) (Federation University, 2022 July). The pandemic highlighted the need to keep students connected in real time, and now post-pandemic, flexibility and agility have become the new normal in a hybrid world (Federation University, 2022 April).

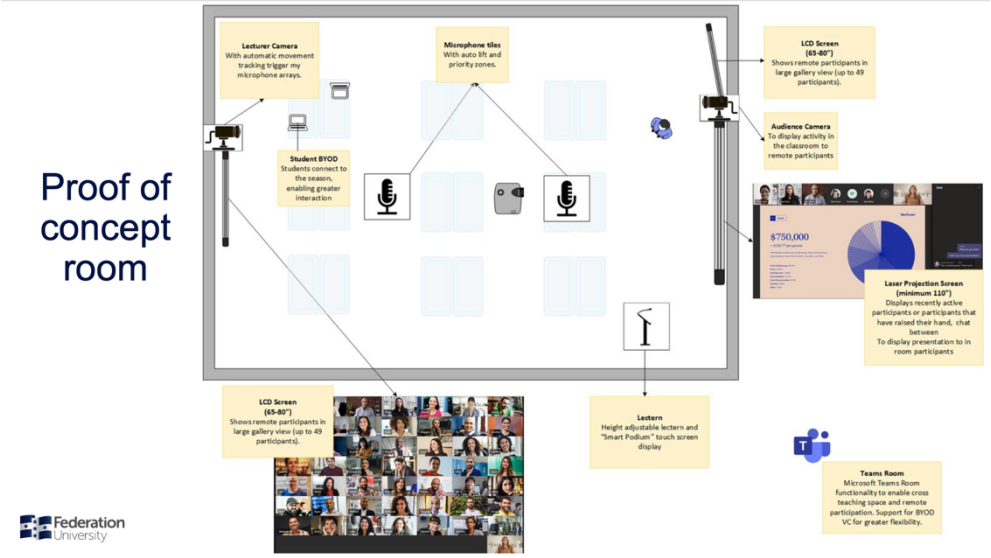
In late 2021, Federation University began trialling blended synchronous environments through what was named the Connected Classroom Initiative (CCI). CCI uses technology-enhanced equipment such as video cameras, microphones, and screens, fitted into physical classrooms for a cross-campus learning experience that provides students with the opportunity to access and interact with academic facilitators in real-time, as shown in Figure 1. Learners, academic staff (present at the lead campus) and facilitators (present at other connected campuses) may join a Connected Classroom from a dedicated space or from their personal devices.

This presented the opportunity for multi-campus synchronous delivery and the potential for increased flexibility and efficiency to gather online and face-to-face students in unified spaces. The need to cater for remote and rural students and

teachers with ongoing uncertainties from the pandemic required solutions to enable 'presence' regardless of physical location. Direct instruction modes can still dominate, so to make the CCI successful there needed to be a shift away from this approach towards student centred models such as active learning. It was not expected that teachers would be able to perform this change on their own, in addition to mastering new classroom technology. Therefore, setting up professional learning for changing academic practices was integral to prepare for the CCI. A cross-departmental team was formed to provide various areas of support for the teachers during the pilot phases. This included, but was not limited to, IT support to facilitate learning around how to use the classroom and the technology, and Learning Designers to support pedagogy/andragogy shifts to incorporate frameworks to enhance learning in this new environment.

Figure 1

Connected Classrooms Proof of Concept



Note. Image by Erin Penny – Team Leader ITS (used with permission)

Educational researchers have long purported that educational technology can provide affordances for learning but must be informed by sound educational design and pedagogical planning (Herrington & Oliver, 2000; Garrison & Vaughan, 2011; Raes et al., 2020). Cameron-Standerford et al (2020) state that "readiness to use technology and course management systems is an important factor for continued research and professional development" (p 7), therefore considering the blend of technology, pedagogy, and teaching is an important area of research. Next, we elaborate on the design of pedagogy for the use of these spaces, such as the modes, models and spaces of teaching and learning.

Theoretical Underpinning

Blended Synchronous Learning

Though there are many definitions of what exactly constitutes blended learning, or indeed, just what is being blended, they all tend to vary on a few common themes. These include delivery method, instructional methods, and instruction (Graham, 2005). A working definition of blended learning has been proposed by Graham (2005) who defines it as systems that "combine face-to-face instruction with computer-mediated instruction" (p. 5). Regardless of the definition, blended learning has been an omen of change in higher education as institutions have increasingly adopted it with various configurations and spectrums in education (Dziuban et al., 2018). Some have suggested it is the "new normal" in course delivery (Bozkurt, 2022, p. 2), though others state that trying to define what is normal for education will be in "perpetual flux' (Dziuban et al, 2018, p. 3).

The CCI utilises these ideas as a form of blended synchronous learning (BSL), which can be defined as an instructional method where teaching and learning take place simultaneously for both on-campus and on-line students via computer-mediated communication technologies. Raes et al's (2020) systematic literature review on BSL states that "flexibility" is the most cited benefit for students and teachers (p. 15). For educational organisations, BSL may reduce attrition by guaranteeing continuity of instruction regardless of students' circumstances (e.g., work, health, family, distance), therefore providing greater flexibility (Vanslambrouck et al., 2018). Pedagogically, it can provide richer learner experiences through collaboration and interaction. Raes et al (2020) note there are challenges surrounding orchestrating an equitable learning environment and need to change pedagogy based on how technology influences teaching in these environments.

Community of Inquiry – Teaching Presence

Bruggerman et al (2021) argue that teachers face many challenges when transitioning to blended learning environments, including changing pedagogy and acquiring new technological skills. They also note that in many cases the teacher may have to adjust their teaching style, strategies, and techniques to suit each group's unique learning environment, which has the potential to be mentally taxing for the teacher. Therefore, one of the focuses of the learning designers and academic support staff during the pilot studies was to introduce pedagogy before the teachers went into the teaching space. While many valuable pedagogical frameworks have been examined in previous BSL research, some are more technology-focused or difficult to parlay to academic staff. The Community of Inquiry (COI), developed

by Garrison et al (2000) was employed to provide a useful model for its visual and conceptual simplicity and common understanding.

The Community of Inquiry (COI) theory proposes that learners' social, cognitive, and teaching presence are three basic factors that influence the overall educational experience of students. COI is aimed at designing, facilitating, and directing social and cognitive processes to achieve expected learning outcomes. Teaching presence is important in determining online learning efficiency, satisfaction, performance, and engagement behaviours (Garrison et al., 2000). Studies on online teaching presence have focused on its relationship with learning engagement, collaborative knowledge construction, and learning satisfaction (Anderson et al., 2001). It is important for teachers to be aware of the many factors involved in teaching presence, as attention to these factors can enhance the learning experience for students. Attention is said to be critically important to the mental processes central to learning (Shapiro et al., 2011) and is one of the fundamental building blocks for social relationships (Jha, 2021). Therefore, the next section of this paper will bring our focus to attention.

Attention

Much of the literature appears to focus on how students do not pay attention in class and lose focus, or on students' resilience, rather than considering attention, focus, and resilience of academics (de los Reyes et al., 2022). The division of attention or trying to pay attention to two or more tasks at the same time can have harmful effects on student performance (Shapiro et al., 2011), and we would suggest that it would also have the potential to be detrimental for teachers. Research that focuses on the impact of this from the teacher perspective is in its early stages (Roeser et al., 2013) with more recent papers focusing on job stress and burnout (Madigan & Kim, 2021), and some considering how to promote stress management (Hepburn et al., 2021). Therefore, investigating how the factors of attention and focus might be present with the Connected Classroom added to the focus of this research.

Shapiro et al (2011) stated that "[a]ttention is increasingly divided in the modern world, as information flow increases and individuals seek to perform multiple activities simultaneously or seek multiple stimulus inputs" (p. 497). Introducing BSL increases the number of activities teachers are asked to do in a classroom, and as multi-tasking has been seen to be a myth (May & Elder, 2018), the teachers are engaged in what is referred to as task-switching. When the mind switches between tasks, it can have large decreases in performance and increases the number of errors made (Rogers & Monsell, 1995; Yeung et al., 2006). It has been noted that teaching is among the most stressful of occupations (Roeser et al., 2013; Lee et al., 2022), and teachers' emotions can influence, both positively and negatively, their attention, memory, thinking, and problem solving (Trigwell, 2012). Interaction between teacher and students impacts learning outcomes

(Osman, 2020), therefore managing how teachers balance those interactions could be key. So how do we create teacher presence when we ourselves are not present in the moment and we cannot pay attention to everything everywhere all at once?

Research Questions

As support staff, our role in the CCI was structured to assist teachers in the recognition of their need to transition away from direct instruction, lecturing, or other methods of teaching, and towards the guiding framework of COI. This study sought to explore how the teacher presence element of COI would then manifest itself once the teachers and students were in the Connected Classroom spaces. Experience from the pilot phases, as well as the literature around BSL and task switching, led to the following research questions focused on the discourse facilitation element of teacher presence:

- Were the teachers able to facilitate discourse and be present in class discussions?
- Did the teachers struggle with attention and focus given the multiple spaces they were simultaneously teaching in?

Methodology

A qualitative approach was implemented to reflect the exploratory nature of the research in both data collection and analysis. Qualitative methods are particularly useful in studies where the discovery of new information is sought (Norton, 2009), or studies which allow for the respondent to contribute to the dialogue (Gordon, 2011). This is particularly important in acknowledgment of the variety of perspectives and experiences gathered from the participants and then interpreted by the researchers as reflexive in this research (Flick, 2018).

Data Collection

The data was collected using a phenomenological framework to inform its qualitative approach and to provide deeper insight into Connected Classroom teaching by "investigating experience as we live it rather than as we conceptualize it" (van Manen, 1990, p. 30). In this way, the methodology focuses on gathering and interpreting the "lived experiences" and perceptions of the participants, specifically about the Connected Classroom and their teaching approach and practices. Participants were recruited through purposive sampling, with contact via direct email due to their involvement during the Pilot 2 phase of the CCI. Five academic staff chose to participate in the study and provided informed consent prior to their interviews. Two interviews were proposed for each participant to be conducted via Microsoft Teams by the first author. The first interview (pre-interview) was conducted with participants prior to starting CCI training, and the

second interview (post-interview) took place after the end of their teaching period. Overall, nine interviews of approximately one hour each were completed: five pre-interviews and four post-interviews due to one participant not continuing with the CCI, and who therefore did not participate in the second interview.

A semi-structured interview guide was employed that included prompts for key research areas with flexibility for other questions to be asked as the interview progressed. The interviews reflected the different experiences of each academic in the Connected Classroom and the semi-structured guide allowed enough room to discuss their thoughts on the experience freely, taking their individual contexts into consideration.

Data Analysis

A reflexive thematic analysis (RTA) method was employed to analyse and interpret the interview data. This approach allows for the development of themes from the dataset, while acknowledging the role of the researchers within this process (Braun & Clarke, 2022). For this research, a constructionist and experiential framework influenced the analysis to capture and investigate the realities of our participants' Connected Classroom experiences and their perspectives on teaching. The interview transcripts were reviewed by the researchers to familiarise themselves with the data, and then coded in spreadsheets to generate initial ideas both at a semantic and latent level to explore surface and implicit meanings within the data (Braun & Clarke, 2006). At the same time, the researchers were aware of their reflexive position with the data in order to collate these codes into themes, using the initial research areas of pedagogy shift as an inductive orientation to the data as well as our own deductive lenses to explore specific threads emerging from our interpretation of the data. While the issues in divided attention with the increase in the number of activities was a known factor for the researchers in supporting the CCI, it was not a specific avenue of questioning in the interview guide. Rather, the analysis of the post-interviews reflected this distinct thread within the participants' perspectives on their experiences in the Connected Classroom.

Having conducted RTA, we identified several key themes: (1) the importance of focus and attention in the Connected Classroom space and the challenges that arise from competing demands; (2) the role of technology in facilitating discourse and its potential to hinder communication; (3) perceptions of the students' experience in the Connected Classroom space and how it impacted the teacher; and (4) the competing role of trying to maintain teacher presence while also managing multiple tasks and spaces. In the following section we will explore these themes and discuss the implications of our findings for the CCI, and more broadly, BSL environments.

Findings and Discussion

Theme 1: The Importance of Focus and Attention

Our findings suggest that teaching in the Connected Classrooms could be exhausting for teachers. Specifically, they needed to provide attention and opportunities to different groups of students, and in the Connected Classroom this might be face-to-face, online, as well as students and facilitators in other connected spaces. Consistent with earlier research, that attention is increasingly divided when we seek to perform many activities at once (Shapiro et al., 2011) and that multi-tasking is a myth (May & Elder, 2018), the BSL seemed to make it even more difficult to focus, an important factor that was mentioned by many of the respondents.

- *[P222] "You learn how to jump in the room and have a chat to them. The issue with that is obviously I found that when the groups needed some help. Yeah, you can easily say the ones in the classroom, and you can go to them straight away, but the ones in the breakout rooms they were harder to see if they needed help at all. Yeah, just sort of sharing your time between the online groups and the classroom groups. Umm. It was a bit of a challenge."*
- *[P242] "And then focus on what particular people are saying, but…. Like I found like it was just like information overload like I got, and I felt the students felt that too. I couldn't shift my focus or attention to multiple platforms at once."*
- *[P252] "I had, so I had multiple things, so I don't know if that's why, whether is trying to switch between too many things. In a short period of time, if it's in a class, it works because you know I can just open it up. Uh, and also like, you know, the students in the classroom sometimes, you know, I have to like, oh my God, I'm looking at the screen. Talking to them and then?"*

Theme 2: The Role of Technology

Managing technology and equipment for the online groups as well as face-to-face students was also noted to be challenging, especially if technical problems cause disruptions and difficulties for both the teacher and the students, leading to frustration and exhaustion. The factor of technology issues was mentioned by all the respondents, with half of the respondents focusing on this aspect strongly in their interview, suggesting that it was an important attribute to them.

- *[P212] "I mean it's numeracy and digital tech, so it does, we did talk a bit about how technology doesn't always work how you want it to work*

and it's (subject area), so nothing, the students weren't respond the way you think they will at times and so we did use it, the Connected Classroom as teaching focus as well."

- *[P252] "It started off, you know, I was very excited when I started, you know, as I was telling you, like, I love the technology aspect, but I think it was, I would say it was difficult. I had like lots of issues. Especially the technical aspect, so you know from where I started to what I feel about it now. I wish you know; I wish I had like more, I wish I had the technology working a bit foolproof I had. You know, I think I had lost a lot of time in the class. I lost some of my students' interest. I couldn't cover whatever I wanted to teach."*

Theme 3: The Perceptions of Students

When considering the perceptions of students and the ability to facilitate within the Connected Classroom, the results were mixed. Some academics found that having multiple classrooms, while distracting at times, could bring together various viewpoints that a single campus had not considered. Another academic found the team-teaching beneficial in facilitating discourse as they could bounce ideas off the other facilitators as well as the students. Others found that there was a clear difference between the online students' discourse (via the chat) and the face-to-face students.

- *[P222] "I've never had anyone that wanted to put their audio on, they just want to chat... to ask questions. And then yeah, I found that the students in the classroom, you know, they're a bit quiet to start with and then when they become comfortable with the lecturers and the content, then they'll ask more questions."*
- *[P242] "I think in students feeling that they could contribute, and they didn't want to contribute when the cameras are on or when the audio was on by basically froze up the moment we turned it off, that free to open up and then they said well, so what's the point of the connected classroom because… supposed to be connected, but they didn't want to contribute."*

Within the theme around students, a subtheme of perception of safety arose from the scripts. This subtheme is similar to the findings of Mallia (2021) when considering student camera use and non-use during online lectures. Communicating with different groups of students effectively was noted to be challenging, especially when they have different needs, expectations, communication styles, and comfort level in the classrooms. The teacher needed to ensure that everyone was on the same page and that everyone had access to the

same information, which many said was tiring. Halonen (2013) noted that "When students discern unresolved adjustment problems in their professors, they are likely to focus on self-protection rather than learning" (p. 46). The sub-theme that arose from the data was that many respondents found that they were uncomfortable with the Connected Classroom, and then shortly after commented that the students were also uncomfortable, with some participants mentioning issues of "safety" with student concerns.

- *[P212] "I'm usually pretty selective and in my class and I'll sort of do that eye thing where you catch someone's eye and just wait until they answer. And that's tricky because you don't want to do that if they've got to be on the camera and talking to another group because they're not feeling as safe."*
- *[P222] "But the students tend to steer away from the cameras anyway, so they I quickly found out where the cameras couldn't find them and tended to sit there. Yeah, and online student, they didn't put their cameras on."*
- *[P242] "And I think it was a case of, well, if you're uncomfortable, I'm uncomfortable kind of thing. And then it just became well, a case of let's try and reduce as much of the uncomfortableness of this as possible, so we end up turning off the cameras and the audio, so the students felt comfortable. But then that negates the purpose of that Connected Classrooms."*

Theme 4: The Competing Roles

Based on our analysis of the data, we found that the teacher presence element of the COI framework manifested itself differently in the Connected Classrooms compared to online classrooms. Specifically, we found that the academics were able to facilitate discourse, but mainly if they reverted to face-to-face teaching and turned the cameras off. They also faced challenges with attention and focus due to teaching in multiple spaces simultaneously.

- *[P212] "No, we definitely shifted how we taught, to a point where we still did the same sort of things, but it was also combining with the other groups. We were very open with the students that this is a trial for us as well and we're learning in this space. Not everything is going to work how we think it will work and we were open with them about how the timing, which was a really good lesson, I think for them that you know you can have the best plans in the world, but the group of students you have on that day in that moment with those resources, with this happening outside, is not going to be how you planned it."*

- *[P242] "And I had one student who tried both. So, she was online, and she said it was a horrible experience in the Connected Classrooms online because you felt the teacher wasn't fully present."*
- *[P252] "Umm, but as I'm telling you know, the way the model that I teach, you know the what the multiple things that we are going through so. If you're just doing like one sort of one sort of activity, probably you know you can have like a more, I don't know it becomes much more simplified. But as if you're doing that, the level of activity that I'm trying to do, like the multiple things, so then it adds a bit more complexity. Because you're switching between different topics, different activities."*

To address the research questions of the study, two main areas were investigated: the ability of teachers to facilitate discourse and be present in the discussions, and the potential struggle with attention and focus given the Connected Classrooms environment. The findings suggest that academics were generally able to facilitate discourse, despite the challenges with multiple student groups and technology. However, attention and focus seemed to be compromised in this space, creating potential issues for increased mental effort, which could lead to decreased performance and increased errors.

Conclusion

The focus of this exploratory study was to investigate teacher presence in the Connected Classroom with a focus on blended synchronous learning. The researchers (as support staff) already held preconceptions that the move to BSL would be a difficult journey for most teachers. This was due to the multitasking required to navigate: the new classroom technologies; the information and communication technologies; teaching their learning content; establishing students in the teaching spaces; and ensuring their cognitive and social presence could be effectively orchestrated. Furthermore, unpredictable complications such as microphone noise sensitivity, classroom technologies malfunctioning, student complaints, and students' perception of safety due to the cameras, contributed to the negative experiences reported by participants.

While previous research in BSL focuses on the student perspective, this paper serves to highlight that attention and focus is a critical factor in establishing teacher presence and their ability to teach effectively. This also highlights that future implementations of BSL need to attend to deeper consideration of the academic support factors required to assist teachers to troubleshoot, navigate, and thrive in these in this complex classroom environments.

Limitations and Further Research

The limitation of this study was the small number of teachers initially interviewed, compounded by the smaller number of teachers re-interviewed after their time in the Connected Classroom. Recommendations for future study include expansion of teacher perspectives and approaches beyond the pilot phases of the project as the Connected Classroom Initiative shifts into "business as usual" for university teaching and learning.

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