Facilitation strategies for enhancing the learning and engagement of online students

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Recommended Citation

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Abstract

The opening up of online education in the Australian tertiary sector has made higher education accessible for a wide range of students, including those living in rural and regional areas. While student numbers continue to grow as a result of this opportunity, there are increasing concerns regarding low student retention and progression rates for online students in comparison with on-campus students. Reasons for this vary, however, online students report a sense of isolation and disconnection with their studies highlighting the need for educators to utilise effective facilitation to enhance student connections to an online community. In this paper, we investigated facilitation strategies using two case studies. This illustrated how two online instructors used design-based research to evaluate the impact of facilitation strategies on instructor presence, instructor connection, engagement and learning in maths education and human biology subjects. Findings indicate that focusing on social, managerial and technical facilitation strategies resulted in an increased instructor presence and active involvement, which in turn were influential in motivating students to engage with learning online. The findings have implications for higher education providers and instructors who are tasked with engaging online students. This identifies the importance of targeted online facilitation to enhance learner-instructor and learner-content engagement.

Keywords

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Abstract

The opening up of online education in the Australian tertiary sector has made higher education accessible for a wide range of students, including those living in rural and regional areas. While student numbers continue to grow as a result of this opportunity, there are increasing concerns regarding low student retention and progression rates for online students in comparison with on-campus students. Reasons for this vary, however, online students report a sense of isolation and disconnection with their studies highlighting the need for educators to utilise effective facilitation to enhance student connections to an online community. In this paper, we investigated facilitation strategies using two case studies. This illustrated how two online instructors used design-based research to evaluate the impact of facilitation strategies on instructor presence, instructor connection, engagement and learning in maths education and human biology subjects. Findings indicate that focusing on social, managerial and technical facilitation strategies resulted in an increased instructor presence and active involvement, which in turn were influential in motivating students to engage with learning online. The findings have implications for higher education providers and instructors who are tasked with engaging online students. This identifies the importance of targeted online facilitation to enhance learner-instructor and learner-content engagement.

Introduction

Online learning is important for increasing participation in higher education, yet a large proportion of online students, particularly those from disadvantaged backgrounds, drop out, often early in the course. However, students are more likely to persist with their studies if they are able to integrate socially and academically with the university community (Stone 2017), which can be facilitated through effective course design and the presence of the online instructor.

Multiple studies have shown that the majority of online students are mature-age, in paid employment and/or with caring responsibilities for children and other family members such as ageing parents (Hewson 2018; Ragusa & Crampton 2018). The online cohort is also characterised by higher proportions of students from regional, rural and remote areas, as well as those from low socio-economic backgrounds (Stone 2017). While online learning has opened up further study for these students, the benefits are diminished by low student retention and progression rates compared with on-campus students. Fewer than 40 percent of online students were found to have completed their degrees over a nine-year period (Department of Education and Training [DET] 2017) and withdrawal without a qualification is 2.5 times more likely (DET 2017). Reasons for incompletion include technology challenges (Yoo & Huang 2013), family, work and other commitments limiting time available for study (Greenland & Moore 2014), and poorly designed course materials and delivery (Devlin & McKay 2016).

Studies have stressed the importance of sufficient communication and contact with tutors and other students, with the presence of the online instructor being particularly important to avoid students experiencing a sense of isolation and 'aloneness' (Resop-Reilly, Gallagher-Lepak & Killion 2012, p. 104). A number of studies (Stone 2017) have identified the importance of understanding and recognising the diversity of the online student cohort, contending that it is only through recognising, understanding, and valuing this cohort that an equitable experience can be achieved. If institutions expect this cohort to be largely the same as the on-campus cohort, there are likely to be 'gaps between expectations and delivery' (Hewson 2018, p. 10) on both sides. Understanding the important fundamental differences between on-campus and online learners is therefore a pre-requisite for designing teaching, learning and support strategies to effectively engage and support students.

The study in this paper aimed to investigate the effectiveness of facilitation strategies used by instructors to enhance online engagement. Specifically, we present two case studies that illustrate how instructors incorporated facilitation strategies into their respective online units and the impact these strategies had on students' engagement. In doing so, we addressed the following research questions:

> What facilitation strategies are used by instructors to encourage student engagement?
> How successful are those facilitation strategies in encouraging student engagement?

In the following sections, we present a review of the literature and an outline of the methodology and context for the two case studies. The findings and discussion are structured around the impact of the facilitation strategies identified in the literature and conclusions and implications of the study are outlined.

Review of the literature

Facilitation strategies

In the online environment, facilitation strategies have been shown to be particularly influential in actively engaging students in their courses (Martin, Wang & Sadaf 2018). While understandings and definitions of engagement vary, they typically include reference to behaviour, cognition and emotion, with a recognition that these domains are inherently interconnected (Fredricks 2011). In the online learning context, a number of dimensions of engagement have been identified, including level of academic challenge, active and collaborative learning, student-faculty interaction, and enriching education experiences (Kuh 2001). Facilitation strategies, including online discussions and instructor created content using multi-media, can be utilised by online instructors to provide support to students and keep them actively engaged with learning. This requires the instructor to act as a facilitator and be actively engaged and present in the course in order to facilitate learning (Martin, Wang, & Sadaf, 2018).

The role of the online teacher or instructor, particularly in terms of their presence, also appears to be vital for building interaction and connectedness between teacher-student and student-student. Indeed, Ragusa and Crampton (2018) found that 'the quality and timeliness of lecturer feedback was the most valued form of learning communication identified by students regardless of course' (p 15). While there are a number of practical ways to establish lecturer presence, and thereby foster student engagement, Moore (1993) identified three interaction categories that are particularly relevant to our study: learner-learner, learner-instructor, and learner-content. Martin and Bolliger (2018) found that learners particularly valued learner-instructor engagement strategies, with consistent instructor presence considered the most valued engagement strategy.

Instructor presence

Establishing instructor presence in an online setting is challenging but essential to the success of asynchronous online courses (Martin, Wang & Sadaf 2018). Instructor presence has been found to enhance students' motivation to learn, increase the depth and quality of students' interactions and discussions, reduce the sense of loneliness, and improve student performance (Martin, Wang & Sadaf 2018). Similarly, students who have a strong connection with their instructors achieve good learning outcomes and are more confident than those who consider their instructors to be less supportive (Creasey, Jarvis & Knapcik 2009). Lecturers and subjects that stimulate interest have a positive effect on engagement (Park & Choi 2009; Muir et al. 2019), with evidence showing that 'it is the presence and behaviour of the lecturer, rather than peers, which is key to student engagement online' (Muir et al. 2019, p. 12).

Discussion boards

Online courses/units typically make use of discussion boards which are used to facilitate interaction between learner and instructor, learner and learner and learner and content. The use of interactive discussion boards in online learning suggests they can be important tools to foster student engagement (Baldwin & Sabry 2003), but students and facilitators have been critical regarding the structure of forums and the quality of interaction and content (Thomas & Thorpe 2019). According to Bradshaw and Hinton (2004), both the lecturer and the student can provide the scaffolding of learning in online discussion forums; however, it is the online presence of the facilitator that is essential to enable positive learner-instructor participation (Shea & Bidjerano 2010).

In discussion board forums, there is an expectation for lecturers/tutors to be facilitators of conversations, providing opportunities for academic and social engagement (Redmond et al. 2018). In a recent study, Muir et al. (2019) found that although students craved presence and activity from

their lecturers/tutors, in some instances, they did not hear from them at all, or only sparingly, for a whole semester. It seems reasonable to expect that instructor presence is vital if we expect our students to engage (Pittaway & Moss 2014).

Student engagement in online discussions is often difficult to perceive as students may choose to only read posts rather than actively engage by posting; referred to as pedagogical lurking (Dennen 2008). This does not necessarily indicate a lack of student engagement (Tsiotakis & Jimoyiannis 2016), and may be entirely appropriate, depending on the context in which discussion boards are being utilised in the pedagogical framework. For students to actively learn in an online environment, an effective social, teaching and cognitive presence is required (Bair & Bair 2011; Dole & Bloom 2009; Garner & Rouse 2016; Zhao & Sullivan 2017). This can be fulfilled through the effectivedesign and facilitation of discussion boards to establish conducive learning environments (Douglas et al. 2015).

Theoretical Framework

Martin, Wang and Sadaf (2018) identified twelve different facilitation strategies to enhance instructor presence and instructor connection while enhancing learning and engagement. Table 1 provides an overview of these strategies aligned with social, managerial, pedagogical and technical aspects or dimensions.

Table 1. Facilitation strategies to enhance online engagement (adapted from Martin, Wang & Sadaf 2018)

Dimension	Facilitation Strategies
Social	Video based instructor introduction
	Instructors' presence in the discussion forums
	Ablility to contact the instructors in multiple ways
Managerial	Video based course orientation
	Instructors' timely response to questions
	Instructors' weekly announcements to the class
Pedagogical	Instructors' timely feedback on assignments/projects
	Instructors' feedback using various modalities
	Instructors' personal response to student reflections
Technical	Instructors' use of various features in synchronous sessions to interact with students
	Interactive visual stimuli
	Instructor-created content in the form of short videos/multimedia

In a survey conducted with 188 online graduate students in the U.S., Martin, Wang and Sadaf (2018) found that instructors' timely responses to questions and timely feedback on assignments/projects were rated the highest by students. Overall, students reported positive results for all twelve facilitation strategies, and indicated that instructor presence and connecting with the instructor were influential for engagement and learning. We used the aspects outlined in Table 1 as the basis for the theoretical framework that underpinned the case studies reported in this paper. In addition, we drew on Moore's (1993) three interaction categories: learner-learner, learner-instructor, and learner-content to interpret the results.

Methodology

This research adopted a constructivist perspective, characterised by the belief that knowledge is constructed rather than discovered and that there are multiple perspectives or interpretations (Stake 1995). This approach was appropriate given that the research occurred in a natural setting where the researchers were positioned within the research (Creswell 2013). Furthermore, a case study approach was adopted whereby the use of facilitation strategies by two different instructors in two different courses was investigated. The case study approach provided for a focus on individuals' perceptions and portrayed 'what it is like' to be in a particular situation (Cohen, Manion & Morrison 2000).

Both cases took place in a regional Australian university. The units on which the case studies are based were selected for investigation because they were taught in different modes of blended and online learning, provided rich data from high student enrolments, and illustrated teaching initiatives across different disciplines.

Case study one: Methods and context

The first case study involved a cohort of ninety pre-service teachers who were enrolled in *TPM1: Teaching Primary Mathematics 1* in Semester One, 2019. This unit was the first of two mathematics pedagogy units studied by pre-service teachers (PSTs) in a two-year Masters of Teaching degree. There were two cohorts of students within the unit: on-campus and fully online. Each cohort had the same access to the weekly learning content materials and general discussion boards. The online students were part of an online tutorial group that also had specific dedicated weekly discussion boards, which provided a space for them to contribute to questions or topics related to each week's content.

Following Ethics approval, data for the study were collected through weekly interviews conducted with the instructor, discussion board posts, metrics in the University learning management system: My Learning Online [MyLO], post-semester student surveys, post-semester student interviews, and University-solicited student evaluation data [eVALUate]. A total of twenty students completed the post-semester survey and nine students participated in post-semester interviews.

The post-semester survey contained eleven Likert-scale items that required participants to rate their agreement with statements about their use of the discussion board. All survey responses were anonymous. Interviews with the instructor followed a semi-structured protocol, and included questions such as 'What strategies did you try this week to encourage student engagement?', and 'What evidence do you have that students were engaged this week?' Interviews with the students were also semi-structured and were conducted by a research assistant to maintain anonymity and confidentiality and to reduce bias.

Descriptive statistics were used to analyse the metrics in MyLO and survey item responses. Qualitative comments in the surveys, discussion board posts and interview transcripts were analysed using both inductive and deductive methods. Data analysis was based on the facilitation strategies adopted by the unit instructor, the interaction categories supported by those strategies, and the impact on student engagement. In addition, the researchers were open to inductive themes that emerged from the data. Following some initial analysis, the data were imported into NVivo and assigned codes.

Case study two: Methods and context

The second case study involved a cohort of predominantly health students enrolled in a First Year unit offered by the School of Health Sciences in Semester Two, 2018: either *FHB1 Foundations of*

the Human Body (n-=38) or *HAP1 Human Anatomy and Physiology 1B* (n=229). FHB1 students were typically pre-degree students enrolled in a health pathway through the University College while HAP1 students were enrolled in a Bachelor degree (laboratory medicine, pharmacy, sport and exercise science, medical research, nutrition, health science/medical radiation science, psychology, biotechnology, science or human movement studies).

FHB1 is an online unit and HAP1 is a blended (flipped learning design) unit taught on two campuses. Each unit was set up with weekly content released to students incorporating a mix of instructor-created content using a variety of platforms including Articulate and Echo360, written text, images, and YouTube videos with embedded formative assessment. Online discussion boards were the main communication tool used online and were not assessable. In addition, webinars were offered weekly in FHB1 to facilitate student engagement. Weekly announcements were posted by the unit coordinator in both units, and students were encouraged to engage with the online content on a regular basis. Campus coordinators regularly responded to emails from students.

Data were collected using eVALUate, unsolicited communications from students, and participation in online discussion boards using MyLO metrics. Descriptive statistics were used to analyse metrics and eVALUate data to evaluate student engagement. Qualitative data analysis was based on the facilitation strategies adopted by unit instructor, the interaction categories supported by those strategies, and the impact on student engagement.

Results

Case Study One: Tara And TPM1

This case study reports on experiences of a fully online cohort of PSTs who were enrolled in the blended unit TPM1. The results are presented in relation to facilitation initiatives that were utilised by the lecturer to promote engagement in the unit, and to encourage learner/instructor; learner/learner; and learner/content interaction.

Weekly introduction videos

In addition to an introduction video prepared about the unit each week, students were provided with a two to three minute video outlining the expectations for that week's content. The aim of the videos was for the students to feel that Tara was having an individual conversation with them about the important aspects for that week, to suggest what they should focus on if they were short on time, and to share images of resources referred to in the weekly content. Ongoing reflection on the delivery of the videos did not result in any significant changes, other than the inclusion of different resources. Monitoring of students' access through MyLO indicated that the videos were accessed regularly, although not always in the weeks intended. Throughout the semester, the format of the videos did not alter significantly. Survey responses showed that 93 percent of students agreed or strongly agreed that they 'accessed the introduction videos each week'. Student eVALUate responses included the following comment:

> The weekly videos were a welcome addition to the online format for me. I appreciate the personal nature of them and each week was clearly set out both in writing and verbally. I wish all the other subjects had a weekly intro video like this subject. (TPMI Student personal communication 2019)

Interview feedback from students included the following:

> … I did watch them each week. I think they're good … I like the idea of having an instruction video because it set the tone for the week, especially as some of the content was incredibly new for me. (TPMI student Marissa personal communication 2019)

And I like the fact that every week, there was an introductory video and it … was current. So, you know, it made you feel like you were having a conversation with her, and she was talking about things that had actually happened the week before. (TPM1 student Kayla personal communication 2019)

Yes, I made sure those videos were the first things I watched every week before I did the rest of the content. I thought they were a really good overview, but I also think they could've been a bit more focussed ... like, maybe just even a couple of minutes explaining how to approach the maths before we learn how to teach it, if that makes sense. (TPM1 student Lisa personal communication 2019)

Discussion boards

In TPM1, weekly discussion boards were set up to enable online students to respond to questions that were integrated into each week's content. From previous deliveries of the unit, Tara anticipated that the use of the discussion boards would fluctuate throughout the semester; some students would be very active in terms of posts, while others may not post at all. There was no mandatory requirement to post, rather an expectation that postings were an engagement indicator and an opportunity to interact with the lecturer and other students. Initiatives to encourage engagement involved providing students with two to three topics each week and inviting them to post to one or more topics; giving regular feedback on discussion posts, including setting up alerts to notify when students posted; creating one thread for each topic and continuing to build on that thread, rather than creating new threads; and including a follow up question when responding to students' posts. In addition, there was a general discussion board for questions about the unit content and assessment tasks. In terms of contributions during the semester, one hundred responses were posted about general discussion topics, and questions about assessment tasks generated 241 responses.

Table 2 provides a snapshot of the five most popular and five least popular discussion topics, along with the week in which they occurred.

Table 2. Responses to weekly discussion topics

Topic	Week	Number of responses
Metaphor	1	95
Response to Jo Boaler TEDTalk	1	82
Hundreds chart	2	60
Place value activity	2	57
Response to Clarke article	3	45
Place value questions	3	1
General questions/comments about multiplicative thinking	9	2
Algebraic solution to basketball problem	12	4
Discussion about PE1	10	7
Solution to hot dog vendor problem	12	7

The greatest number of responses were posted in the first few weeks of semester, while the least number of responses occurred towards the end of the semester. This was likely attributable to a number of factors, including the timing in the semester. Early in the semester students tended to be enthusiastic about contributing, and early on assessment tasks were not due, and the provocative nature of the topics tended to encourage discussion between peers. Interview feedback provided further insight into students' motivation to post:

> In the first couple of weeks, everyone sort of is active. And then, I don't know whether they get busy, and so, it drops off. That's certainly what it seems to be because I know, as we sort of progress, if you actually look at the numbers on the postings, they dropped off. And it was the same people that were posting regularly. (TPM1 student Kayla personal communication 2019)

> I found this in general, with all of my subjects as well, not just this one, being online, but at the start of the unit, I was really, really passionately being online and frequently doing the discussion boards, but because it wasn't compulsory, I found as the workload got heavier and the semester went on, I kind of dropped back a bit on the participation. (TPM1 student Lisa personal communication 2019)

The topics that attracted the most postings either required the students to reflect on their own beliefs and attitudes or to share ideas for practical activities. For example, the metaphor topic required the students to respond with a metaphor of their own after watching a short video clip of a student who stated that: 'If maths were a vegetable, it would be broccoli because it's necessary, it's good for you but it doesn't taste good'. Similarly, after watching a TEDtalk by Jo Boaler,[1] students were asked to reflect on their own beliefs about learning mathematics, and growth and fixed mindsets. These topics generated rich discussion and increased evidence of learner-learner interaction as shown in the following discussion board postings:

> Hi everyone

> I certainly felt that Jo's attitude 'broke the ice' for someone like myself who has not studied math for a very long time, and gave it up due to feeling like I did not have the brain for math. In regards to my own schooling I gave up on maths once I reached a high school setting [where] it was very much about the correct method and answer. (TPMI student Carly personal communication,February 2, 2019)

> Hi Carly

> I had the same initial inclination about maths having a set of rules and formulae to remember, but recently I have started reading Eddie Woo's book, Woo's Wonderful World of Maths. One thing I'm starting to see is that if we support children's deep understanding of maths concepts then they don't need to memorise rules to have success as they can apply their understanding to solve a problem. (TPMI student Tamara personal communication March 4, 2019)

The less popular posts involved the opportunity to participate in some mathematics and/or were of an open-ended nature, e.g., 'Please post any questions you had about this week's content'. The lack of responses to these topics may have been attributable to limited confidence in solving mathematical problems, especially those involving fractions or algebra, and/or the absence of a provocative statement or stimulus.

Further information about students' use of the discussion boards is shown in Table 3. These data were drawn from an optional survey administered at the end of the semester.

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[1] How you can be good at math, and other surprising facts about learning/Jo Boaler/TEDxStanford/
https://www.youtube.com/watch?v=3icoSeGqQtY&t=17s

Table 3. Students' levels of agreement about use of MyLO

Item	Strongly Agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree
I contributed to the discussion posts on MyLO	44%	31%	19%	6%	0%
I received timely responses to my posts on MyLO	56%	25%	13%	6%	0%
I contributed more to the discussion posts in this unit than my other units	0%	19%	13%	50%	19%
I was motivated to post each week	13%	25%	38%	13%	13%
I would have posted more if posting was compulsory	38%	25%	6%	31%	0%
The discussion topics motivated me to post	19%	25%	44%	6%	6%
Once I posted I didn't engage in any more discussion for that topic	13%	44%	19%	13%	13%
I responded to lecturer feedback/questions for my posts	13%	50%	25%	6%	6%
Following one thread was conducive to my learning	38%	19%	31%	6%	6%

Qualitative survey and interview responses provided further insight into students' use of the discussion forum and the influence of instructor initiatives, such as 'Following one thread was conducive to my learning':

> Responding to discussion boards/post was more reflected on the time I had to study rather in content etc. I found that I responded evenly through my units, I tried to allocate time evenly. (TPMI student personal communication 2019)

> I found them good for info and discussion of ideas, unfortunately I found that with work, family illness/caring I didn't have as much time for on-going engagement as I would have liked, and needed to prioritise learning time to content and assignments. I also live with a primary school teacher and have two maths friends who are teachers so was able to converse with them more easily. (TPMI student personal communication 2019)

> Tara had set it up differently, so that you kept building on the thread … the first person started, and then we all replied to the same thread … and the idea was that you finish your post, commenting on what the other people had posted, and then adding your bit to it, and posing another question. (TPMI student Kayla , personal communication 2019)

In terms of lecturer presence, it seems that this was also an influencing factor in motivating students to post:

> Tara regularly posted in the discussion boards, as well as prompted us to think more deeply by asking questions and encouraged us to end our discussion posts with a question for the next poster. (TPMI student personal communication 2019)

> She seemed to prompt more thought and tried to extend or guide thinking which was helpful. (TPMI student personal communication 2019)

As mentioned previously, student posting was not mandatory in this unit. Table 3 shows a mixed response to this issue, with 63 percent showing some agreement with posting more if they were compulsory, while 31 percent disagreed with that statement. The following survey comments refer to that aspect and highlight that students might be 'active' without posting:

> My other two units had compulsory posting each week, including discussion with peers. Due to this I engaged a lot more with those units. I used the discussion boards in TPM1 to check my thoughts and progress, but because there wasn't a grade linked to the posting in this unit, I used that as an opportunity to give myself a rest from that aspect of learning. (TPMI student personal communication 2019)

> While I did not engage in discussion, I was very active in reading the discussion posts. I found them very relevant to the assignments unlike other units, as well as the end of unit exam. (TPMI student personal communication 2019)

Instructor-created content in the form of short videos/multimedia

Two synchronous online webinars, which were also recorded, were conducted throughout the semester. The webinars focused on unpacking the expectations of the two assessment tasks. As expected, the students reported in the survey that they found the webinars useful ('I found the assignment webinars helpful for completing the assessment tasks': no-one disagreed; 25 percent neutral; 75 percent strongly or somewhat agreed). The following comment illustrates students' use of the webinars:

> I could not attend the webinars as they were going but she made a point of recording them so that was useful for me because there's so much going on in the evening with the kids and dance and sport and all that stuff. But it's fantastic that they do record it and that it's there to access during the week. So, yes, I found them especially valuable when it came to the assessments, they were very, very useful. (TPM1 student Jasmine personal communication 2019)

Most weeks featured one or more video excerpts which were used to demonstrate a particular concept/activity, serve as a motivator for promoting engagement in discussion boards, and/or link with classroom practice. For example, in Week Six, students were asked to respond to a student named Bethany, who asked in a video: 'Why do we invert and multiply when dividing fractions?' Discussion postings showed that the students responded to Bethany on a personal level:

> I would explain to Bethany that we invert the dividing fraction and turn it into a multiplication equation because it is a shortcut. Who doesn't like shortcuts...? I would demonstrate both ways so that Bethany had a better understanding of what I meant. (TPMI student Cara personal communication 2019)

> I think it's an excellent idea to show BOTH ways of working out the problem, which should help Bethany to see which way is quicker. It's definitely important to use visual representations to ensure Bethany understands WHY the rule works... otherwise it's just 'another' mathematical rule. (TPMI student Cara personal communication 2019)

Student eVALUate feedback on this initiative was positive, as the following illustrative comment shows:

> The use of videos with her daughter asking questions was encouraging and helping us to see the problem from a teacher perspective to teach a student. (TPM1 student personal communication 2019)

Summary of case study one

In summary, this case study has illustrated a variety of initiatives which incorporated facilitation strategies to enhance engagement in an online unit. Overall, student feedback demonstrated that the initiatives were well received, yet engagement throughout the semester, as indicated by discussion board activity, fluctuated. While there was evidence that the discussion board forum provided opportunities for learner-learner, learner-instructor and learner-content interaction, factors such as other commitments, lecturer presence and engagement of other students appeared to influence motivation to engage.

Case Study Two: Donna and FHB1 and HAP1

This case study reports on the online facilitation strategies adopted in two First Year health science units, FHB1 and HAP1.

Online announcements and regular emails

Announcements were regularly utilised in FHB1 and HAP1. Regular weekly announcements were released with the next week's content to provide a guide for students as to what was required in the following week of study. Students were encouraged to set up notifications for announcements so that they would receive an email when an announcement was made on the unit site.

> I really appreciate the weekly 'To Do' lists on MyLO, they help me keep on top of everything and make it very simple to navigate through the unit. Teaching was very good. (HAP1 student personal communication 2018).

The aim of the announcements was to enable students to plan their week ahead and be alerted about upcoming assessments or essential hurdle tasks they needed to complete. They were also made aware of online content with which they needed to engage prior to attending face-to-face classes and were introduced to the staff taking their on-campus active learning sessions. This was particularly important for the HAP1 students who needed to engage with online pre-class material prior to attending face-to-face active learning lectures and practical/tutorial sessions in which the online content would be actively discussed and applied. As FHB1 students were studying online, the weekly announcements were an important tool to guide them through the materials and tasks they were required to access and complete online.

Additional announcements were also released intermittently to remind students of generic processes, such as Census date, student learning workshops, and unit-specific processes including details of upcoming assessment requirements, Peer Assisted Study Sessions and practical and/or tutorial requirements. Most of these announcements were written although some were audio recorded.

When asked what they liked about the unit, one HAP1 student commented:

> Weekly posts by teaching staff and discussion board interaction. Formative quizzes are also useful. (HAP1 student personal communication 2018)

Regular emails were also sent to students to remind them of unexpected changes to class schedules or assessment tasks, and individual students were emailed when they missed specific assessment items. Students were encouraged to use online discussion boards to query content in the units but many emailed staff as a preference. This was particularly the case for FHB1 students who were fully online. Emails were answered as promptly as possible and when similar email queries were received from a number of students, a post was put up on the relevant unit discussion forums for the benefit of all students.

> Very quick response/ useful replies from emails from both [campus coordinators]. Thanks [campus coordinators] and everyone else involved. :) (HAP1 student personal communication 2018).

The combination of announcements and email communication ensured that students received *just-in-time* information relevant to the context of their unit.

Online content of units

HAP1 is a blended unit taught to students from two different UTAS campuses. It is delivered in a flipped learning model which requires students to engage with content online and then attend a weekly active learning lecture and practical/tutorial session to reinforce and extend their learning of the unit content. This teaching pattern was familiar to most of the students who had completed CZZ101 in the previous semester. The online content is organised in modules, and is presented in a variety of ways using Articulate (a cloud-based e-learning platform), lecture recordings using a green screen, Echo360 lecture recordings using PowerPoint, YouTube clips, written text and visual diagrams/animations. Formative quizzes are used within each module, enabling students to assess their knowledge of key concepts as they work through the online material. Each module also has a 'What to do this week' webpage to guide student learning. Positive student evaluation feedback was received regarding various elements of this learning design:

> Organisation of what to do each week, and the practice quizzes. Opening up the pre-classes the week before also helped with getting through them before the ALL. (HAP1 student personal communication 2018).

> The review quizzes at the end of each module were great. They explained why an answer was wrong, which helps clarify concepts / help us realize what the gaps in our knowledge are. There should be more review quizzes. (HAP1 student personal communication 2018).

> I thought that the online lectures and notes were for the most part well-written and organised. Everything that we needed to know for assessment tasks was included in the online lectures and I always found the learning objectives useful. The formative quizzes at the end of each online lecture also provided me with good feedback on my understanding. (HAP1 student personal communication 2018).

> The course content is interesting and is mostly presented online in a simple and user-friendly manner with lots of diagrams and imagery. (HAP1 student personal communication 2018)

> This unit is very well organized and very easy to follow the weekly units. (HAP1 student personal communication 2018).

FHB1 is an evolving online unit having been traditionally taught as an on-campus unit for many years. Online lectures and relevant resources were released in weekly modules and webinars were offered on a weekly basis to provide a platform for students to discuss tutorial-based questions related to the weekly content.

> Thanks for presenting the material online in easy-to-follow PowerPoints. The tutorial questions really helped to guide me to the essential knowledge. (FHB1 student personal communication 2018)

There was poor attendance at the webinars (averaging 8 percent of the enrolment) but the webinars were recorded for all students to access.

> Thanks for providing the Collaborate sessions– they did help me to learn difficult content. FHB1 (FHB1 student personal communication 2018)

As reported in student eVALUate responses for the units, the majority of students enrolled in HAP1 (82 percent) agreed that the quality of teaching in this unit helped them to achieve the learning outcomes compared with 71 percent in FHB1. With respect to their learning experiences in the unit, only 66 percent of FHB1 students agreed that the learning experiences in the unit helped them to achieve the learning outcomes compared to 91 percent of students enrolled in HAP1. It is important

to remember that all HAP1 students were at Bachelor level, and most of the FHB1 students were pre-degree and fully online, which may have influenced these responses.

Discussion boards

To facilitate HAP1 student engagement in the online environment, discussion boards were set up for each module in the unit, and students were encouraged to engage in discussions with one another through asking and answering questions. Occasionally, a staff member would post a question to one of these discussion boards to stimulate student discussion. An additional Question and Answer (Q & A) discussion board was also set up and facilitated by the unit coordinator. A total of 222 students were enrolled in this unit, enrolled in Hobart or Launceston, and it was hoped that the discussion boards would facilitate online interaction between students on each campus. Students were able to post anonymously and there was no compulsory requirement to post to the discussion boards. The level of engagement in each discussion board by both staff and students is shown in Table 4.

Table 4. Engagement in online discussion boards in HAP1

Topic	Threads	Posts
Q & A	44	99
Neuroendocrine	1	5
Reproductive System	2	7
Cardiovascular System	5	13
Respiratory System	6	17
Digestive System	5	11
Renal System	4	12

As shown in Table 4, the Q & A discussion board was the most utilised discussion forum, and the unit coordinator and campus coordinator of the unit also reported receiving emails on a frequent basis. Limited discussion posts were posted to the Content discussion boards with posts frequently authored by the same students. For example, a total of nine students posted to the Content discussion boards, and a further nineteen students posted to other discussion boards in the unit. The student who posted the most frequently to any discussion board in the unit posted forty-nine times while 194 students did not post to the discussion boards at any time during the semester. Some students also appreciated the resources that were posted to the discussion boards to enhance learning:

> Donna is evidently enthusiastic about the unit and it is easy to comprehend content with her explanations. I also appreciated the guided answers Donna has put up for some modules. (HAP1 student personal communication 2018).

In the second unit (FHB1), which was offered fully online, content discussion boards were offered for students to discuss any content. A total of thirty-four students were enrolled in the unit, mainly in pre-degree courses. Unfortunately, the students were not willing to engage in these online forums, with no students posting to the Content discussion boards. The single Chemistry post was made by an academic staff member. The students, instead, preferred to email the unit coordinator despite suggestions from staff to utilise the discussion boards. A compulsory discussion board was also set up for students to actively answer a question posted by the previous student and ask a question for the next student to answer. This form of discussion board has been popular in previous units, with

students recognizing that the discussion posts enabled them to become more familiar with terminology specific to the content in the unit. The students were unable to access one of their online quizzes if they did not post to this discussion board. This discussion board engaged most of the students in the unit with twenty-five out of thirty-four students posting on it. Interestingly, eight of the nine students who did not complete the compulsory discussion board posting failed the unit overall. The level of engagement in each discussion board by both staff and students in this unit is shown in Table 5.

Table 5. Engagement in online discussion boards in FHB1

Topic	**Threads**	**Posts**
Questions for the Lecturer	33	92
Compulsory Discussion Board	1	26
Chemistry	1	1
Cells	0	0
Metabolism	0	0
Cell Division	0	0
Genetics	0	0

One FHB1 student commented that the most helpful part of the unit was 'access to lecturers for questions through discussion boards' (FHB1 student personal communication 2018).

The online environment can be challenging for a diverse range of students. This was particularly evident in the unit in which pre-degree students were not comfortable posting to the discussion board, even when it was compulsory. In both units, students utilised the discussion boards to ask the unit coordinator and lecturers questions about the unit, although emails were also a preferred form of communication for this purpose. There was no summative assessment linked to the discussion boards in either unit and this may explain the lack of student engagement overall. The challenge to be addressed by the unit coordinator moving forward is to develop engaging discussion boards that will facilitate students to post and enhance their online learning experiences.

Summary of case study two

In summary, this case study has highlighted the importance of guiding students through online content in a *just-in-time* process, particularly for students who study fully online. A number of strategies can be utilised to encourage learner-learner, learner-instructor, and learner-content interactions, although such opportunities are not always utilised by the student cohort. This is particularly the case when there is no assessment linked to online activities such as discussion boards or when the students feel disconnected to the unit, possibly due to isolation in their learning. However, the use of regular announcements, incorporation of interactive content online linked clearly to any face-to-face sessions, online discussion boards, and the presence of academics in the units can have a positive effect on student engagement at First Year level.

Discussion

This section begins with a discussion about the different facilitation strategies employed by both lecturers and the impact they had overall on student engagement. These are grouped according to

the dimensions of social, managerial and technical (N.B. neither instructor explicitly documented pedagogical aspects), and include reference to Moore's (1993) interaction categories of learner-learner, learner-instructor, and learner-content.

Facilitation strategies

Social

Both case studies illustrate that the instructors were willing to adopt a range of different facilitation strategies as identified by Martin, Wang and Sadaf (2018). In terms of the social dimension of the framework, Tara incorporated weekly video-based instructor introductions and maintained an active presence in the discussion forums. Although Donna did not prepare weekly introductory videos, she maintained an active presence in the discussion boards and provided her students with multiple ways to contact her. As indicated in the data, Tara's weekly introductory videos were accessed regularly and helped establish a connection with the online students. The qualitative comments showed that, as reported by Martin, Wang and Sadaf (2018), introductory videos helped form a relationship right from the start of the unit, which enabled students to feel supported and may have impacted positively on student progress through the course (Creasey, Jarvis & Knapcik 2009).

Both case studies contain details of the use of discussion boards with feedback indicating that the lecturers were influential in terms of achieving student engagement with the forum. In Tara's case, she carefully considered strategies that would motivate students to engage with the content, the instructor and the other students. For example, topics such as place value and algebraic solutions to problems were heavily focused on the interaction strategy of learner-content. Similarly, Donna used designated content discussion boards based on topics such as chemistry, the respiratory system, and the digestive system. Students' use of the content-related discussion boards focused heavily on questions about the content when it was related to assessment tasks. For example, in Tara's unit, there were 241 assignment related question posts generated, compared with a total of one hundred posts for the general discussion board topics. While posting in Tara's unit was not compulsory, Donna found an increase in posts when contributions were linked with accessing future content.

Both instructors employed the strategy of ending a response to a discussion post with a question. This approach aimed to increase interaction between learner-learner and learner-instructor. In keeping with recommendations from the literature (Ko & Rossen 2010), both instructors also maintained a common thread, responded frequently to students' posts, and used students' names when replying to posts. Although there is little agreement as to what constitutes instructors' active involvement in discussion boards (Martin, Wang & Sadaf 2018), data suggests that if students receive timely responses to their posts, they appreciate the efforts of the lecturers to interact and respond promptly. As found by Dennen (2008), student engagement in discussion boards can be difficult to perceive as students may only read posts rather than actively engage by posting. Comments from Tara's students indicate that this was the case in her unit, with only 35 per cent of students indicating they were motivated to actually post each week. Similarly, in Donna's unit, there was evidence that students were reading the posts without actively posting, and that they appeared more comfortable with emailing lecturers rather than posting questions to the discussion forums.

Martin, Wang and Sadaf (2018) emphasised that due to the potential isolation experienced by online students, it is important that the instructor be contactable in multiple ways. While this was not readily apparent in Tara's case, Donna's students regularly emailed lecturers, often in preference to posting on discussion boards. Although not explicit in the data collected, a university requirement for all units is that all lecturers and teaching staff provide phone and email contact details, with the expectation that emails are responded to within three working days.

Managerial

Both cases utilised managerial facilitation strategies in the form of instructors' timely responses to questions and instructors' weekly announcements to class, and highlight examples of learner-instructor interaction (Martin & Bolliger 2018). The MyLO platform houses a dedicated announcement space and the facility for instructors to receive alerts when posts, including questions, are submitted by students to weekly discussion topics. Both instructors utilised these affordances. Weekly announcements to students included reminders about engaging in relevant activities prior to class (if appropriate), weekly requirements, assessment task reminders, and notifications of when weekly content was posted online and available. As Ko and Rossen (2010) highlight, weekly announcements particularly assist students who are often balancing work, family, and study, and are helpful in assisting students with time management. Consistent with findings from Ragusa and Crampton (2018), students also appreciated prompt and quality responses to their questions and posts, especially when they were related to assessment tasks, as indicated in both case studies. As Muir et al. (2019) reported, students were inclined to be disengaged if they thought their lecturers were not attentive or even ignoring them. The two case studies show that both instructors were proactive in responding promptly to students' posts, which was partly achieved through the alert system within MyLO.

Technical

The technical dimension of Martin, Wang and Sadafs framework (2018) was primarily enacted, in both cases, through instructor-created content in the form of short videos/multimedia. These were examples of learner-content interaction (Moore 1993). Tara, for example, utilised videos to assist students with making connections between theory and practice, and to motivate them to post to the discussion board. This strategy appears to have been effective, as evidenced by the large number of posts to the metaphor discussion topic. Donna utilised videos as a means of presenting content to students, particularly when it was of a challenging or difficult nature, and occasionally used short videos in announcements. In common with Tara, the videos provided a stimulus for the discussion boards, and in Donna's case, were particularly influential in stimulating posts in the Question and Answer forums.

Conclusions

The study reported in this paper focused on the engagement of university students studying online and the impact of a suite of different teaching strategies implemented to enhance online student engagement. In particular, two case studies have been presented which describe the facilitation strategies used by instructors and their success in encouraging online student engagement.

The first case study was based on a blended unit taught by Tara. She used weekly introduction videos, discussion boards, instructor-created content, and interactive webinars to enhance the engagement of students studying the unit in an online mode. The data for the second case study were collected from students enrolled in two units taught by Donna. The engagement initiatives used in those units included: online announcements and emails; a variety of online content such as lecture recordings, formative quizzes, and webinars; and discussion boards. All strategies facilitated interaction, with evidence reported of learner-instructor and learner-content engagement.

In order to support the online learning and engagement of their students, both instructors maintained an active presence in their discussion forums through regular online communication and content presentation. They found that the use of discussion boards was influential in facilitating the engagement of online students with the learning content, as well as with instructors and other students in the unit. The data revealed that specific strategies, including ending discussion posts with

a question, maintaining a common discussion thread, and providing timely and personalised responses to posts and queries were perceived positively by students. Posting to the discussion board was not a mandatory requirement in either unit. It was found that levels of student activity on the discussion boards (measured by numbers of postings), fluctuated noticeably during the semester, influenced by factors such as assignment submission dates, and students' personal circumstances including work and family commitments. Further, it was reported that some students elected not to create discussion posts, but rather monitored the posts made by other learners and the instructors, or communicated with the instructor directly by email.

In evaluating the impact of this study, the findings confirmed that the instructors' ongoing, regular, and frequent communication with students was important for establishing and maintaining student engagement in the units taught. The facilitation strategies were strengthened by instructor accessibility and provision of prompt feedback to student questions. It is suggested that such online teaching initiatives serve to support student engagement and positively contribute to students' feelings of belonging to an online learning community.

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