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ORIGINAL RESEARCH ARTICLE

I do, I understand: engaging distance and campus students in sustainability through active learning

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Distance online learning connects students to education opportunities without having to be present at the institution offering the learning module. This case study involved development of a dual on-campus and distance course into a fully online course. It required a student-focused approach and an innovative application of learning technologies, additional resources and learning frameworks to encourage student engagement, independent learning and growth of critical-thinking skills. Changes to the design of the teaching approach and the use of technology improved the quality and quantity of interaction and communication between staff–students and students–students and facilitated a hands-on learning experience for online students interacting asynchronously. Student engagement with the course material, other students and teachers increased compared to previous years. Additional resource videos, learning and assessment guides (written and video), and online field trips helped develop critical-thinking skills and connectedness of learning to real-world applications. Recommendations are provided of learning approaches that could be used by other educators in different subject courses.

Keywords: learning technologies; online; asynchronous learning; learning resources; distance teaching; sustainability

Introduction

Asynchronous distance learning has become more popular, especially in a world wrestling with a pandemic (COVID-19), but it has been the chosen method of teaching for many years by some educators (Garrison 2003; Laurillard 2012; Tyler and Zurick 2014). For students of online learning, the benefits include the ability to continue working on other commitments, not having to move to the location of the learning institute, and the associated financial burden and time out of their regular lives, which can accompany face-to-face learning systems (Nieuwoudt 2020; Stone 2017; Stone and Springer 2019). Engagement of students is an issue when a course is taught online, both asynchronously and synchronously. In order to reduce attrition associated with on-line learning, it is vital to engage students as early as possible and keep them engaged (Angelino, Williams, and Natvig 2007). However, it is important to

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note that higher engagement cannot be gained using just any form of learning activity (Dixson 2010). Good communication with students and the relationship between technology and pedagogy are important (Dixson 2010; Hege 2011).

Often online courses are delivered over a shorter time period (i.e. are more intensive) than face-to-face learning but allow flexibility as to when students access the learning and engage in the activities and assessment work (Devlin and McKay 2016; Mimirinis and Bhattacharya 2007; Nieuwoudt 2020; Vlachopoulos, Jan, and Lockyer 2019). However, despite the advantages of online learning, problems have been noted, such as feeling isolated due to reduced or lack of connectedness with instructors and fellow students (Stone and Springer 2019; Tanis 2020), motivation and time management due to work and personal commitments (Greenland and Moore 2014; Kebritchi, Lipschuetz, and Santiague 2017), and technology and course design-related difficulties and anxiety (Diep *et al.* 2019; Mimirinis and Bhattacharya 2007).

For online courses to be effective for students and encourage participation and learning, design of the course needs to move from a teacher-centred to a student-centred format with students having more responsibility for their learning and success (Annansingh 2019; Mimirinis and Bhattacharya 2007). A student-centred course format helps students build understanding from the course information and through their own experiences and learning (Annansingh 2019). On-line lectures and assistance videos allow students to revisit the teaching material multiple times to reinforce what they are learning (Nicol 2021). This requires students to take responsibility for engagement (Baran and Correia 2009) along with facilitation by the educator to encourage student engagement with the content and context, educator and other students in order to achieve the learning outcomes (Vlachopoulos, Jan, and Lockyer 2019).

Online learning technology alters the role of the educator (Devlin and McKay 2016, p. 101), and an online course is not simply a face-to-face course adjusted to an online platform but must be developed with the technology, and student engagement and participation in mind using a range of resources and multimedia (Devlin and McKay 2016; Kebritchi, Lipschuetz, and Santiague 2017). Short lecture videos; un-assessed quizzes; and short supporting videos, readings and activities provide a more useable learning environment and aid student understanding (DeLotell, Millam, and Reinhardt 2010; Stone and Springer 2019), as do discussion forums, case studies and real-world examples and experiences (Annansingh 2019; Martin and Bolliger 2018). A range of resources, assessments and approaches to presenting information and encouraging student engagement enables the content to address student's differing learning goals, experiences, cognitive processes, interests and motivation through acquisition, inquiry, practice, production, discussion and collaboration types of learning (Laurillard 2012, p. 96).

Choosing a learning platform and other multimedia that are familiar to students, and easy to navigate, will assist in reducing technology barriers to learning (Devlin and McKay 2016). This requires a course that has been developed specifically for online learning rather than developed similar to or out of a face-to-face course (Stone and Springer 2019; Vlachopoulos, Jan, and Lockyer 2019). The learning environment needs to deliver the flexibility students require and a mode of operating that aids students in engaging with the course content and people (Devlin and McKay 2016). The online learning platform needs to facilitate quality interactions and learning (Nieuwoudt 2020). Students may not be familiar with all technologies used by the educator,

and this can be a barrier to learning and engagement, so inclusion of technical support is required (Diep *et al*. 2019).

Students will require clear course objectives, content, assessment requirements and expected outcomes (Dai 2019; Kebritchi, Lipschuetz, and Santiague 2017; Kuiper, Solomonides, and Hardy 2015; Stone 2017; Tanis 2020) along with appropriate technology support and guidance, in order to be well informed and have confidence and competence (Diep *et al*. 2019; Kebritchi, Lipschuetz, and Santiague 2017; Nieuwoudt 2020) as they engage in online self-directed learning. This content must be well structured, and assessments and communication need to develop enquiry, exploration and meaningful connection to help develop students' deep learning (Annansingh 2019; DeLotell, Millam, and Reinhardt 2010; Stone 2017).

For students to be assured of the presence and support of the teacher, educators can facilitate student learning through weekly reminders and encouragement (written, audio and/or video) (Kuiper, Solomonides, and Hardy 2015; Martin and Bolliger 2018; Stone 2017; Tanis 2020). This requires staff to be well organised and disciplined in initiating regular contact with students (Tanis 2020). In addition, educators need to be available during times that suit students best (e.g. evenings), rather than just during normal work hours, to answer enquires or engage in discussion (Stone and Springer 2019). Some element of synchronous learning (e.g. real-time online discussion forums or Zoom meetings) can aid in this sense of presence (Tyler and Zurick 2014). All these forms of engagement create an online presence, personalise the experience, help students to feel known, supported and therefore more likely to engage in communication that will facilitate their learning (Devlin and McKay 2016; Nieuwoudt 2020; Stone 2017; Stone and Springer 2019). This must be balanced with the increase in student email messages that can be overwhelming for the educator, and requests for a response at times not acceptable to the educator. Therefore, student's expectations have to be managed without impacting on their engagement and learning (Annansingh 2019; Nicol 2021).

There are many strategies for engaging students in active online learning; however, how to implement them is less obvious. The rules identified by Nordmann *et al.* (2020) encompass many of the strategies utilised in this study, although we were not aware of them at the time. This study seeks, through use of technology, and changes into the design of the learning unit, to trial a number of approaches to increase engagement of students with course material, staff and each other, and to gauge the success of these strategies. A further aim was to identify learning approaches that could be used by other educators in different subject areas.

Method: The case study

At a university in New Zealand, a course in the sustainability of materials is offered as a compressed Summer School distance option. It is a stand-alone learning unit, not associated with any particular discipline or course of study, available to all students at the university. Sustainability of materials is a fast-changing subject area that requires a system thinking approach to understand the complex interactions between the various system components. Peer learning and support is a valuable part of the course. It was initially available on campus (~third of students) and distance (~two-thirds of students) from 2018 to 2020, but distance only from 2021. With student numbers doubling from 2018 to 2019, it became apparent that greater engagement of online students with staff and each other was needed. In addition,

the teaching approach in 2019 was becoming more time consuming. The crux of the problem was that students required a learning experience where student–student and student–staff interactions built a shared learning platform, where all felt enabled to contribute. Students also needed to behave as one cohort and not one split by geographical boundaries. The subject requires students to engage in the practice, not just theory of sustainability, so there was a need to take the classroom outside the classroom. This, however, posed difficulties for online learning. Interventions were trialled to improve these interactions in 2020 and 2021, with changes for 2021 informed by data and feedback from 2020.

For the first 3 years (2018, 2019 and 2020), the material was presented linearly, following the weekly schedule of on campus seminars, albeit delivered and recorded as lecture fragments. Prior to the 2020 COVID-19 pandemic, the decision was made for the course to only be offered only online in 2021 due to low on-campus student numbers. Additionally, using data obtained from 2020 on engagement of the students with each other and the course material, the means of delivering the course was altered to be asynchronous with course content fitted into a cyclic lifecycle model. This move away from a linear, progressive structure allowed students to 'dip in and out' of the course material as they undertook their own learning and worked on the various assignments and marked discussion boards. Students could access the course material when and in whatever sequence they chose. All course material was made available online from the start, along with a detailed Course Book outlining the course material, an overview Road Map and Suggested Timeline recommending when course material should be read/watched and assignment work started to meet due dates. Weekly update videos were recorded by teaching staff and uploaded, along with a weekly 'check in' email (Agins 2000) to provide encouragement and guidance to student through the course. Staff were also available via email and Zoom. In addition, a weekly 2 hour evening open Zoom session was held for students to 'drop in' and ask questions, and a variety of meaningful interaction activities were developed to help create social presence (Dixson 2010). Other changes made were as follows.

Resource videos

Resource videos for the course were produced to provide students with additional information on support, technology and assignments. Clear course, and assignment requirements and expectations are highly important to students (Sheridan and Kelly 2010), and the videos (along with written information) helped provide a visual explanation, not too dissimilar to a face-to-face classroom setting and often involved a demonstration of a process or where information could be found. Each video was kept short (generally 2–5 min) and to a specific topic, rather than one large video covering multiple things, to aid the students in finding them quickly and only needing to access the information they required. Information about Zoom technology was in the form of five short videos, each dealing with one specific aspect of Zoom (Table 1). Teaching staff produced short videos that provided information on the course, components of Blackboard used in the course and assignments (Table 1). The videos produced by teaching staff were intentionally not made professionally and had a more spontaneous 'live' feel. It was hoped the students would understand from this that there was not an expectation of high-quality recorded assignments for their recorded assessments. The 'at desk' videos showed the educator in their office; a usual environment for in-person student-staff meetings.

Table 1. 2020 resource videos (length min:sec) produced to assist student skill development and understanding.

eConferencing	General MATS204 information	Discussion boards	Assignments
Introduction to Zoom (2:05)	Course outline (3:01) *[Coursebook]*	Discussion board 1: Sustainability challenge (4:51)	Submitting assignments on Blackboard (1:29)
Download and install Zoom (1:06)	Seminar schedule (1:48) *[2021 Suggested Timeline]*	Discussion board 2: Future materials and products (1:42) *[2021 Guest lectures]*	Assignment 1: Presentation and marking (4:39)
Zoom on mobile devices (1:54)	Study readiness (3:51)	Discussion board 3: Field trip (2:09)	Assignment 1: Presentation workshop (48:29)
How to join a Zoom meeting (1:54)	MATS204 Blackboard introduction (3:59)	Discussion board 4: Waste audit (2:54) *[not in 2021]*	Assignment 1: How to record a presentation on Zoom (5:12)
How to share a screen on Zoom (1:23)	Accessing e-reserve (1:05)		Assignment 1: peer marking of presentations (3:06)
	General discussion boards (2:48)		Assignment 2: Material analysis and Life Cycle mapping (7:06)
	Accessing ECHO360 (1:59)		Assignment 3: Report (3:05)
	Staff introduction videos (various; 1–3 min)		

Note: Changes made in 2021 are noted in brackets [ ].

Introduction and weekly videos

Teaching staff recorded short (2–3 min) videos introducing themselves and their sustainability challenge, so that students got to 'meet them' and understand that the teachers were on a sustainability journey with the students. It was hoped that these videos would build connections with staff early on in order to help keep them engaged and reduce attrition (Angelino, Williams, and Natvig 2007). Each week a video was uploaded (along with accompanying video) reminding students of what they should be doing based on the learning schedule, advising of any new resources and providing encouragement.

Sustainability challenge – Marked discussion board assignment

Students made short, guided videos highlighting an issue based on their sustainability challenge and shared them in a marked discussion board assignment as a way of engaging in the practice of sustainability and connecting to the theory being taught. Students were expected to contribute comments and suggestions on other videos to develop peer learning and support. Students were able to use current technology and applications (e.g. Smartphones and Zoom) to record, so it was easy to implement and in their comfort zone. Changes made for 2021 involved the addition of a final review/feedback summary of the student's individual challenge, as well as the discussion

board having a grade, formative feedback, which was given by staff who participated in the discussions.

Field trips – Marked discussion board assignment

In 2020, staff live streamed and recorded two field trips to local businesses. Although group interaction was not possible, each student had a field trip experience whether on campus or distance, and the ability to respond to this via the discussion board was designed to help them feel that their experience and voice were important (Zilka, Cohen, and Rahimi 2018). Consequently, in 2021, staff pre-recorded the field trips with the number of field trips increasing to add variety. Students then had to comment on issues relating to social and/or environmental sustainability practices of one of these organisations.

Guest lecturers – Marked discussion board assignment

Experts in areas of materials sustainability contributed pre-recorded seminars. In 2021, additional guest lectures were added to widen the breath of topic areas covered by guests. A marked discussion board asked students to consider two of the guest lectures and comment on how they related to issues being addressed in the course.

Online marking of presentations

An essential aspect built into the recorded presentation assignment was a requirement to mark five other students' presentations. Peer marking and feedback assist students in their learning because they need to understand the assignment requirements and marking criteria, and provide them with a greater array of comments that encourage and help develop motivation and self-esteem (Nicol 2008). The Qualtrics survey platform for students to do peer marking, with a rubric and space for constructive and supporting comments, was introduced in 2020. This involved using a rubric for the marking and giving constructive, supportive feedback. A rubric is useful in helping students understand the marking parameters and provides useful feedback (Tanis 2020). A time period was allowed for the marking process, so that students could work at a time more suited to them. The final mark for the presentation was then a combination mark from staff and students moderated by staff with comments collated and returned to the students. In 2018 (23 students) and 2019 (43 students), the template used was a word document, which students completed for each presentation. A time-consuming collation process then had to be carried out. In 2020 (47 students) and 2021 (104 students), a Qualtrics survey was used as the tool to record the marks and comments, and an R analysis tool averaged the marks and collate the comments. The reduction in workload was considerable and freed staff from a tedious task.

Evaluation of changes

Data were gathered relating to student engagement with course seminar and video content on ECHO360 and Blackboard. Additionally, a survey (with appropriate Ethical Approval in line with the host university Human Ethics Committee Category B

Approval, which is at departmental level) was emailed to all students following the release of final marks in 2020 and following the completion of the course in 2021. The anonymous survey consisted of multiple-choice responses and written responses. Written comments were grouped based on dominant themes and then grouped into categories (James 2006). The purpose of the survey was to gauge how students perceived the effectiveness of aspects of the course: that is, assignments and discussion boards; the means in which the course material was presented; engagement with the course topic; contact with staff; development of their learning; engagement with each other. In 2020, the post-course survey was made available for 5 weeks, with three reminders sent out and 16 out of 44 students completed it. In 2021 only, 20 out of the 105 students actually completed the survey. Due to time constraints to meet the funding report deadline, the survey was only made available for 2 weeks, and only one reminder was sent.

Results and discussion

Engagement with the learning documents

Course content in 2020, and earlier years, was made available to all students in a linear progression, following the pattern of on-campus delivery of seminars. There was a noticeable drop in engagement with course content in 2020 over the 6 weeks of the course (Table 2). The implication was that the course content in the latter weeks was not seen as important, especially as the course had no final exam. In 2021, as a distance only course, all content was provided at the start of the course. The cyclic nature of sustainability and the modular course design lended itself to being engaged with multiple entry points. In addition, a suggested timeline on how to engage with the content was provided to give structure to those requiring it. Survey results indicated that student engagement with the resources, staff, guest, field trip and lecture content videos was higher and did not drop so quickly as the course progressed (Table 2) possibly because students were accessing content in a different order from previous years because it provided a student-centred format for learning that encouraged them to take control of their own learning process (Annansingh 2019). Students had more

Table 2. Student accessing/viewing of MATS204 all course videos via ECHO360 each week of Summer School (includes lecture content, resource, field trip, staff and guest videos).

Ending of summer school week…	Total access/views to videos and slides on ECHO360 2020 – 46 students	Total access/views to videos and slides on ECHO360 2021–105 students	% of total access/ views to videos and slides on ECHO360 (2020)	% of total access/ views to videos and slides on ECHO360 (2021)
1	1488	3553	42.3	30.2
2	477	2566	13.6	21.8
3	651	1809	18.5	15.4
4	269	1789	7.7	15.2
5	430	843	12.2	7.2
6	201	1200	5.7	10.2
Total	3516	11 760	100%	100%

control over what they viewed and when, according to their learning patterns and available times for learning (Devlin and McKay 2016; Stone and Springer 2019).

Student access of Blackboard was assessed by weekday over the 6 week period; the average time viewed per number of students who accessed Blackboard that weekday, and the longest access time of any one student are given in Table 3 for 2020 and 2021. In 2021 (cyclic course design), student engagement with Blackboard content was for a longer duration, compared with 2020 (linear course design) for every day over the whole 6-week period. In addition, the lowest–highest view time for a specific Blackboard access event increased in 2021 (9.4–18.6 min) compared to 2020 (5.8–13.9 min). In 2021, actual access of the lecture content videos compared with the suggested timeline indicated that access of the content on ECHO360 did align with it (Table 4). Students also accessed course content before and after the suggested time. Hence, 2021 students were engaging with the course content more and were motivated to take

Table 3. Student access of Blackboard 2020 and 2021.

	Blackboard access over 6 weeks 2020 (46 students)				Blackboard access over 6 weeks 2021 (105 students)			
	Total hours per day	Number of viewers on day	Hours per viewer on day	Highest view time (min) on 1 day	Total hours per day	Number of viewers on day	Hours per viewer on day	Highest view time (min) on 1 day
Monday	82.47	45	1.8	5.8	229.71	95	2.4	9.7
Tuesday	86.701	45	1.9	7.8	196.78	92	2.1	9.4
Wednesday	88.79	40	2.2	10	203.47	99	2.1	10.6
Thursday	65.26	44	1.5	12.8	220.02	91	2.4	15.8
Friday	88.4	44	2	13.9	234.79	97	2.4	18.6
Saturday	46.7	39	1.1	6.4	138.36	74	1.9	14.3
Sunday	73.64	46	1.6	6.3	233.37	92	2.5	17

Table 4. Number of views of lecture content videos 2021 on ECHO360 (excludes resource, staff, guest and field trip videos) compared with the suggested order (guide) of viewing lecture content videos.

	Overview		Extraction		Processing		Manufacture		Use		Disposal	
	Guide	Actual	Guide	Actual	Guide	Actual	Guide	Actual	Guide	Actual	Guide	Actual
Week 1	■	2350	■	664		29		1		1		1
Week 2		707		930	■	242		28		17		1
Week 3		89		366		492	■	298		52		5
Week 4		37		14		10		486	■	145		20
Week 5		56		20		40		13		303	■	36
Week 6		66		26		2		98		42		97
Total		3046		1925		1302		712		468		333

responsibility for learning rather than simply doing things in the way indicated by teaching staff (Annansingh 2019; Devlin and McKay 2016; Stone and Springer 2019).

Table 5 presents the timeline of 2021 students viewing the resources, guest lectures and field trip videos. It was not possible from the data collected to know if all students watched each video; however, some students began watching content well ahead of the suggested timeline and when it was needed for assignments, although a large number also left watching some videos to the final week. The eight guest lecture videos were viewed on average 110.9 views per video, implying that most students watch all of the videos, even though only watching two of the eight was required. This pattern was repeated with the field trip videos (average 52.3 views per video) when comment was required on only one. There was an average of 110.7 views per video over the 10 assessment help videos. Assessment guidance provided the minimum engagement with the course resources many students chose to view more than this, indicating that the course design encouraged deeper engagement (Annansingh 2019; Diep *et al*. 2019).

Over the COVID-19 lockdown in 2020, university teaching in New Zealand went online, and it is probable that during this time, many students had to access classes/tutorials via Zoom and so picked up these skills during that period. This is reflected in the questionnaire results in 2021 when fewer students accessed the resource videos relating to use of Zoom compared to 2020 (~50% compared to 75%). Students bring skills and experience to the learning environment, and these need to be taken into account, whilst being mindful that some students will have lower literacy related to the digital platforms utilised (Devlin and McKay 2016; Laurillard 2012; Stone and Springer 2019). Hence, care must be taken to not provide resources that are not required as they can clutter the course content to and add to a sense of being overwhelmed whilst at the same time being mindful that some students will have limited literacy related to the digital platform utilised (Annansingh 2019; Mimirinis and Bhattacharya 2007). It would be ideal to monitor the value of still providing the Zoom resource videos.

Ease of access and use of teaching resources

The peer marking of the recorded presentation assignment not only helped students learn about five other topics from their peers but also helped them connect with other students through their encouraging comments. Additionally, from an educator

Table 5. Timeline of views of resource, field trip, staff and guest videos 2021 (on ECHO360).

	Zoom	Assessment help	Guest lecturer	Field trip	Staff introductions
Week 1	81	229	98	0	81
Week 2	39	253	142	30	21
Week 3	91	335	63	37	0
Week 4	1	131	95	66	0
Week 5	0	81	120	162	0
Week 6	0	145	377	333	0
Total	212	1174	895	628	102

perspective, the Qualtrics survey and associated rubric reduced the time teaching staff spent collating marks and comments, and feedback was given to students more quickly. Comments from respondents to the post-course survey in 2020 and 2021 included:

(1) the process – *easy to use, clear, very effective and fast, straightforward, simple and handy*;

(2) the experience – *found this interesting, enjoyed doing this, watched the videos and read the emails before doing this*.

The introduction of unfamiliar forms of assessment requires clear instruction to facilitate understanding and use (Diep *et al*. 2019; Kuiper, Solomonides, and Hardy 2015). The feedback from students indicates that the Qualtrics program, resource videos and written assessment guide, collectively resulted in students engaging positively with the peer-making experience.

Usefulness of supporting resources

Educators often produce all manner of supporting resources that they consider useful to assist students in their learning. However, it is important to determine just how useful these resources are, otherwise they become unnecessary clutter and may result in preventing students from actually accessing them and possibly other more important resources. Over 90% of students who responded in the 2021 survey said that the guidance provided from supporting resources was useful, and all of them (100%) were able to navigate the course material, despite it all being made available at the start of the course.

In 2020, the Course Book and Seminar Schedule were considered helpful by 87.5% of students who responded to the survey. In 2021, with the move of the course to fully distance, the Course Book and Suggested Timeline were both considered helpful by 98.7% and 92.3% of the students, respectively. Written comments about the suggested timeline included: *helpful, and easy to follow and provided good structure to follow.* In addition, assignment and marked discussion board resource videos (Table 1) were considered helpful to engage with the topic by the majority of students.

A resource video on Study Readiness was noted as being helpful in 2021 (81%) by a greater percentage of students compared with students in 2020 (60%), and fewer students said they did not access the video in 2021 (19%) compared to 2020 (33%). Assignment and Marked Discussion Board resource videos were considered helpful by a large percentage of students (over 85%) in both years. The Presentation Workshop resource video was available to assist students with presentation skills and preparing a quality presentation format. In 2020, 94% of student respondents said the video was helpful, and in 2021, by 69%. The Road Map provided in 2021 was helpful for 76.9%, which indicates there is scope for developing the Road Map to increase usefulness to students. It would be ideal to monitor the value of these resource videos to determine student engagement with them and assess the value in continuing to make them available. In addition, thought needs to be given to alternative or additional resources that will support students' deep learning (Devlin and McKay 2016; Knightley 2007) as student access of those currently made available changes.

Examples of student/student engagement

For the Sustainability Challenge, students made videos talking about their Challenge assignment, and these videos were noted by over 85% of respondents as being helpful in getting to know others doing the course. Commenting on other students' Challenge videos also aided engagement with others and helped over 75% of respondents feel part of a learning community. The Challenge assignment assisted in connecting students and increased their sense of being part of a group (Annansingh 2019; Stone 2017; Tanis 2020), despite all being distance learners.

Examples of student/educator engagement

Staff communicated with students via weekly emails and videos to guide learning and encourage students, as well as being available via email, phone and Zoom when students chose to make contact (Martin and Bolliger 2018; Stone and Springer 2019; Tanis 2020). Examples of student comments about the interaction/communication between staff and students indicate that students did feel able to engage with staff: *easy to connect with them; regular email communication was great; staff were very approachable; replied swiftly to emails; I felt confident reaching out.*

Weekly open Zoom sessions were also available in 2021 as suggested by students in 2020. These drop-in Zoom sessions were available one night each week during Summer School, and teaching staff were available for a designated 2 hour period. Very few students made use of the sessions despite them being notified of them through the course book, video communication and emails. Those who attend said they found it helpful. Interestingly, in the 2021 post-course survey, Zoom sessions were suggested again. Hence, more work is required to increase the availability and awareness of these drop-in Zoom sessions, so that a real-time presence is experienced by those requiring this form of contact (Tyler and Zurick 2014).

Examples of critical thinking and connection to 'real world' and own experiences

The inclusion of guest speakers and online field trips provided real-life experiences. Real-life experiences facilitate student deep learning, motivate students to engage proactively with the course content and encourage them to explore learning beyond provided course content and the 'classroom' (Annansingh 2019; Diep *et al.* 2019; Martin and Bolliger 2018; Stone and Springer 2019; Tanis 2020).

The individual student challenge assignment required students to engage in the challenge for the duration of the 6-week intensive course. Student summaries (part of the assessment) indicated that the majority intended to continue with the changes made during the challenge.

Most respondents (92%) said that guest lecturers helped them engage with the topic and broaden their understanding because of the expertise they provided. Examples of student comments about what guest lecturers brought were as follows: *specific/relevant knowledge or experience; unique, outside perspectives and specialties; different ways of explaining/teaching things; their area of expertise/interest; helped fill knowledge gaps; provided different insights; real-life examples.*

Although field trips were pre-recorded and online, the experience still helped the students to get an insight into practices in local businesses and have a greater understanding of practices within a business/organisation. Examples of student comments

about these online field trips were as follows: *was unaware of these great businesses; good to see things happening in real-life; often in papers you learn about the big scale but don't narrow it down to the local scale; good to see how different aspects integrate together.*

Relevant feedback that indicates what 'worked' and what could be improved

All information and course material were made available from the start of Summer School, which was a bit overwhelming for many, which potentially could hinder student learning (Annansingh 2019; Mimirinis and Bhattacharya 2007). Nearly 60% said that initially, the amount of course work seemed overwhelming, but as they progressed through the course, this dropped to 40%. Students did indicate that the sense of being overwhelmed had reduced part-way thorough the course for many of them, but around 40% were still feeling that way. The Suggested Timeline of what to read/watch/do each week was considered helpful by all. Although these findings indicate that more needs to be done to reduce this sense of being overwhelmed, post-course survey responses indicate that a student dictated learning schedule, guided by a Suggested Timeline, worked well for the majority of students.

The online learning processes and resources documented in this case study provide insight into the activities and technologies used for distance online learning. Implementing a successful online distance programme involves continual development and refinement. The authors' recommendations to increase student–student and staff–student engagement, student engagement with learning, and student engagement with practice and critical thinking, are listed in Table 6, along with examples of how these have been applied.

Conclusion

The decision to move a campus/distance taught course to being fully distance (online) involved developing aspects of the learning modules to encourage students to take more responsibility and control of their learning, so as to develop the necessary critical-thinking skills required to take learned knowledge and experiences into future learning and action. All course content was made available to students from the start of the course to give students autonomy as to when they accessed the learning material and engaged with the content that connected students to each other and teaching staff. The course content was developed to assist students in engaging with each other, teaching and guest staff, and with the depth of information available through the internet. Student engagement with the learning resources increased in hours of engagement and was more consistent over each week of the course. Student feedback indicated that the course content helped them to get to know other students, feel part of a learning community, engage proactively with the course content and connect their learning to their previous and course directed experiences.

It is hoped the recommendations resulting from this case study will assist other educators in developing new ways to engage with students to enhance student motivation, learning outcomes, and their application of acquired knowledge and critical thinking to lifetime learning. The examples were ways of implementing the recommendations given, are adaptable to many types of courses and are not limited to only those that are online or taught at a distance. A key message is that getting to a level of

Table 6. Recommendations.

Recommendation	Examples
Communicate regularly with students to increase approachability, sense of presence/connection and availability (staff–student engagement)	• Staff introduction videos; • Staff engaged in the sustainability challenge assignment; • Assignment 'how to' videos; • Weekly guidance and encouragement videos; • Weekly open/drop-in Zoom sessions
Facilitate opportunities for students to interact online and build connection as a learning community (student–student engagement)	• Sustainability challenge videos and comments; • Peer marking and feedback on presentations; • Marked discussion boards.
Ensure learning resources assist engagement and learning	• Provided all information and learning resources at start – students could engage with it as and when preferred; • Roadmap giving visual overview; • Suggested Timeline for engagement with learning resources and timing of assignments; • Resource videos on relevant technology; • Resource videos on accessing teaching material; • Assignment 'how to' resource videos; • Weekly guidance and encouragement videos; • Use of Qualtrics for peer marking and feedback; • Guests lecturers; • Sustainability challenge enabled students to engage with the learning through their own practice/real-world application.
Opportunities to engage with real world examples and facilitate critical thinking and application of learning	• Pre-recorded online field trips; • Guest lectures from specialists/practitioners; • Assessment that required consideration of connections between theory and practice, for example, Sustainability challenge, field trip and guest lecturer marked discussion boards.

communication with students where they feel supported and encouraged rather than lost or overwhelmed by information can take time but can reap multiple benefits for students and staff.

Suggested further research

- Develop online 'field trips' to help students engage with real-world situations and gauge student level of connection through a suitable question as part of the assignment.

- Consider ways students could work in groups via technology to engage in a field trip created/videoed by the group. Currently, this is difficult from many perspectives: finding technology readily available that allows group collaboration of video; designing the assignment in a way that ensures equitable availability and

student involvement; ensuring the work has value to student learning and is not just a teaching/assignment exercise.

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References

Agins, T. (2000) *The End of Fashion: How Marketing Changed the Clothing Business Forever*, Harper Collins Publishers Inc., New York.

Angelino, L. M., Williams, F. K. & Natvig, D. (2007) 'Strategies to engage students and reduce attrituin rates', *The Journal of Educators Online,* vol. 4, no. 2, pp. 1–14. doi: 10.1007/s10639-019-09949-5

Annansingh, F. (2019) 'Mind the gap: cognitive active learning in virtual learning environment perception of instructors and students', *Education and Information Technologies,* vol. 24, no. 6, pp. 3669–3688. doi: 10.1007/s10639-019-09949-5

Baran, E. & Correia, A. P. (2009) 'Student-led facilitation strategies in online discussions', *Distance Education,* vol. 30, no. 3, pp. 339–361. doi: 10.1080/01587910903236510

Dai, Y. (2019) 'Situating videoconferencing in a connected class toward intercultural knowledge development: a comparative reflection approach', *The Internet and Higher Education,* vol. 41, pp. 1–10. doi: 10.1016/j.iheduc.2018.11.001

DeLotell, P. J., Millam, L. A. & Reinhardt, M. M. (2010) 'The use of deep learning strategies in online business courses to impact student retention', *American Journal of Business Education,* vol. 3, no. 12, pp. 49–55. doi: 10.19030/ajbe.v3i12.964

Devlin, M. & McKay, J. (2016) 'Teaching students using technology: facilitating success for students from low socioeconomic status backgrounds in Australian universites', *Australasian Journal of Educational Technology,* vol. 32, no. 1, pp. 92–106. doi: 10.14742/ajet.2053

Diep, A. N., *et al.,* (2019) 'Adult learners' needs in online and blended learning', *Australasian Journal of Adult Learning,* vol. 59, no. 2, pp. 223–253. doi: 10.3316/ielapa.592385127057281

Dixson, M. D. (2010) 'Creating effective student engagement in online courses: what do students find engaging?', *Journal of the Scholarship of Teaching and Learning,* vol. 10, no. 2, pp. 1–13.

Garrison, D. R. (2003) 'Cognitive presence for effective asynchronous online learning: the role of reflective inquiry, self-direction and metacognition', *Elements of Quality Online Education: Ptractie and Direction,* vol. 4, no. pp. 47–58.

Greenland, S. J. & Moore, C. (2014) 'Patterns of student enrolment and attrition in Australian open access online education: a preliminary case study', *Open Praxis,* vol. 6, no. 1, pp. 45–54. doi: 10.3316/informit.935906696497074

Hege, B. A. (2011) 'The online theology classroom: strategies for engaging a community of distance learners in a hybrid model of online education', *Teaching Theology and Religion,* vol. 14, no. 1, pp. 13–20. doi: 10.1111/j.1467-9647.2010.00668.x

James, A. (2006) 'Critical moments in the production of 'rigorous' and 'relevant' cultural economic geographies', *Progress in Human Geography,* vol. 30, no. 1, pp. 289–308. doi: 10.1191/0309132506ph610oa

Kebritchi, M., Lipschuetz, A. & Santiague, L. (2017) 'Issues and challenges of teaching successful online courses in higher education: a literature review', *Journal of Educational Technology Systems,* vol. 46, no. 1, pp. 4–29. doi: 10.1177/0047239516661713

Knightley, W. M. (2007) 'Adult learners online: students' experiences of learning online', *Australian Journal of Adult Learning,* vol. 47, no. 2, pp. 264–288.

Kuiper, A., Solomonides, I. & Hardy, L. (2015) 'Time on task in intensive modes of delivery', *Distance Education,* vol. 36, no. 2, pp. 231–245. doi: 10.1080/01587919.2015.1055058

Laurillard, D. (2012) *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology,* Routledge, New York.

Martin, F. & Bolliger, D. U. (2018) 'Engagement matters: student perceptions on the importance of engagement strategies in the online learning environment', *Online Learning Journal,* vol. 22, no. 1, pp. 205–222. doi: 10.24059/olj.v22il.1092

Mimirinis, M. & Bhattacharya, M. (2007) 'Design of virtual learning environments for deep learning', *Journal of Interactive Learning Research,* vol. 18, no. 1, pp. 55–64.

Nicol, D. (2008) *Technology Supported Assessment* [online]. Available at: https://www.reap.ac.uk/Portals/101/Documents/REAP/Technology_supported_assessment.pdf

Nicol, D. (2021) 'Promoting dialogue in technology-enhanced learning', in *Early Careers in Education: Perspectives for Studentsa and NQT*, eds A. Gillespie, Emerald Publishing Limited, Bingley. pp. 133–142.

Nieuwoudt, J. E. (2020) 'Investigating synchronous and asynchronous class attendance as predictors of academic success in online education', *Australasian Journal of Education Technology,* vol. 36, no. 3, pp. 15–26. doi: 10.14742/ajet.5137

Nordmann, E., *et al.,* (2020) 'Ten simple rules for supporting a temporary online pivot in higher education', *PLOS Computing Biology,* vol. 16, no. 10, pp. 1–18. doi: 10.1371/journal.pcbi.1008242

Sheridan, K. & Kelly, M. A. (2010) 'The indicators of instructor presence that are important to students in online courses', *MERLOT Journal of Online Learning and Teaching,* vol. 6, no. 4, pp. 767–779.

Stone, C. (2017) 'Opportunity through online learning: improving student access, participation and success in higher education', *National Centre for Student Equity in Higher Education* [online], Available at: https://apo.org.au/node/94591

Stone, C. & Springer, M. (2019) 'Interactivity, connectedness and "teacher-presence": engaging and retaining students online', *Australian Journal of Adult Learning,* vol. 59, no. 2, pp. 146–169.

Tanis, C. J. (2020) 'The seven principles of online learning: feedback from faculty and alumni on its importance for teaching and learning', *Research in Learning Technology,* vol. 28, https://journal.alt.ac.uk/index.php/rlt/article/view/2319

Tyler, J. & Zurick, A. (2014) 'Synchronous versus asynchronous learning: is there a measurable difference?', *Proceedings of the 2014 Institute for Behavioural and Applied Management Conference*, Orlando, FL. pp. 52–54.

Vlachopoulos, P., Jan, S. K. & Lockyer, L. (2019) 'A comparative study on the traditional and intensive delivery of an online course: design and facilitation recommendations', *Research in Learning Technology,* vol. 27, no., pp. doi: 10.25304/rlt.v27.2196

Zilka, G. C., Cohen, R. & Rahimi, I. D. (2018) 'Teacher presence and social presence in virtual and blended courses', *Journal of Information Technology Teaching: Research,* vol. 17, pp. 103–126. doi: 10.28945/4061