Engaging large cohorts of international students: Technology Enhanced Learning

Dr. Kulari Lokuge, Associate Director eLearning, Sharon Whippy, Learning Content Designer, Andrew Philips, Unit leader, Dr. Nimal Pinnawela, Unit leader, Monash College, Melbourne, Australia

Accounting and Engineering are the most popular courses currently undertaken at our institute, creating opportunities for students to follow various specialized pathways. Over 80% of the cohort are international students who faces the challenge of studying in a second language. This paper presents the findings based on a pilot using Echo360 Active Learning Platform (ALP) to engage international student cohorts with the use of pre-class, in-class and post-class activities, within a blended delivery model.

The ALP allows the integration of content, student engagement, lecture capture and analytics. A key feature of the platform that proved to be of the greatest benefit was the interactive questions function that enabled real time feedback on students' comprehension. A case study approach was used to investigate the pedagogy that enabled a holistic perspective of the experiences of the participants, allowing the gathering of insights using a combination of qualitative and quantitative data collection methods.

This paper presents the findings of the participant's views and experiences. A particular highlight was the influence of ALP on the change of students pass rate, in the Engineering unit from 55% to 77%, while the Accounting unit showed an increase in the pass rate by 10%.

Keywords: Blended Learning, Technology Enhanced Learning, Active Learning, Teaching

Introduction

According to Jackling (2007), studies have shown that various factors influence students' motivation to undertake university studies and more specifically, to select particular fields of study. Even though the research conducted by Jackling dates back to 2007, at Monash College Introduction to Financial Accounting and Engineering Mathematics are two of the most popular courses in 2017, even after ten years of offering. According to students from our institution, these courses create opportunities to undertake various specialised pathways in the university.

The primary challenge for academic staff has been to engage students further to become active learners (Zayapragassarazan & Kumar, 2012a). Similar to Roehl, Reddy and Shannon's (2013) discussions, it has been a difficult task to gauge students' levels of understanding, especially in large groups. This complexity is further increased by having over 80% of international students enrolled in these courses who have no prior experience in the subject, face language barriers and are still expected to apply their theoretical understanding to solve real-world problems. These challenges have highlighted the need to be skilled with pedagogical strategies to address the specific needs of students whose cultural values and educational practices are different from local students (Santoro, 2014, Dori, & Belcher, 2005).

At Monash College it has become a key objective of the organizational eLearning strategy to find solutions to the challenge of engaging large cohorts of international students, while at the same time providing them with quality learning experiences. Therefore, the key driver of this project was to make processes and tools available that would assist teachers and students to have better opportunities to teach and learn with the use of advanced learning technologies.

Literature Review

Constructivist theories of learning place the individual at the centre of the learning process. Piaget (1959) highlighted that learning is not passively received through the 'telling' of information by others, but is actively built, or constructed, by the learner. In a constructivist view of learning, lecturers create the context and provide relevant information; learners, in turn activate their existing schemas and connect them to new knowledge, there by developing further understandings (Carroll & Ryan, 2007). However, Bourdieu (1984) described that interactions between teachers and learners, and between learners and other learners, assists to fill the gaps in knowledge and to reduce the cognitive dissonance. He also claimed that these interactions

facilitate a higher level of engagement in learning and the development of more complex understanding. Highlighting this idea, Carroll and Ryan (2007) stated that providing facilities to allow for participation in learning discussions and engagement activities, international students are able learn effectively. Jackling (2007) also highlighted that one of the key methods to improve understanding and application of concepts with second language learners is only through immersing them in the situation. While discussions and other interactions among students and teachers can be easily supported in a face-to-face class environment, technology facilitates this opportunity in a broader manner especially when in large cohorts of international students.

Dalgarno (2014) defines poly-synchronous learning as the integration of learner-learner, learner-content and learner-instructor interactions through the blending of multiple channels of the face-to-face, asynchronous online and synchronous online communication. This approach highlights the opportunities for lecturers to communicate concepts through multiple interaction streams such as face-to-face communication, text-based, audio and video resources, and enable students to engage in learning with a variety of methods. Ouyang (2016) considers modern learning opportunities as a communication model that integrates student-centred learning as a pedagogical approach to transform traditional teaching and learning methods. Similarly, student-centred approaches to learning and teaching indicate that the role of the lecturer is to create a context of inclusion where interaction among all students is encouraged and utilised to promote critical learning opportunities (Baeten et al. 2016). This emphasises the importance of creating learning opportunities for international students to engage with the content in a safe environment that ultimately leads to improvement in language skills.

Passive learning relies on individual students to learn by way of lectures or books rather than through interactions with other students or instructors (Hwang, Lui, & Tong, 2005). On the contrary, Rodrigues (2004) suggests that active learning techniques use students' prior knowledge to develop the skills needed to solve problems that involve students in various active learning techniques such as case studies, individual research projects, group projects, and classroom discussions. Braxton, Milem, and Sullivan (2000) defined active learning as activities that require students to accomplish a task, such as solving a problem, and then to reflect on that task. Active learning activities include discussions among peers and cooperative learning experiences (Braxton, Milem, & Sullivan, 2000). When students observe, experience, and/or practice what they have learned, they are usually able to retain the information better (Nilsson, 2010).

The importance of active learning can also be demonstrated through the use of lecture recording systems that enable a critical ability to make remediation sessions available so that students who lack certain skills can remediate without having to spend class time doing so (Edman, Topping, 2011). Lecture recording systems are present in some form across most Australian universities: the Echo360 system is the most frequently used, with 57% of Australasian Council on Open, Distance and e-Learning (ACODE) member universities having this system implemented (ACODE, 2013). Echo360 is also widely distributed across institutions internationally (Echo360, 2015). Other systems of video-recording, though all different in method and purpose, include Panopto, Camtasia Relay, Abode Captivate, Blackboard Collaborate and others.

Students generally report positive responses to lecture recording and use the recordings to support their studies. Several recent studies (Kinash, Brand, & Mathew, 2012; Maynor, Barrickman, Stamatakis, & Elliott, 2013; Van Zanten, Somogyi, & Curro, 2012; Lokuge Dona, Gregory & Pechenkina 2017; Hall & Ivaldi, 2017) reported that students valued lecture-recordings and used them primarily to review the lecture material. Tarr et al. (2015) found that students appreciated the option to learn at their own pace, for example, by doing the required reading immediately prior to listening to the recording of a lecture, hence maximising effective study time. Students also appreciated being able to pause the recording whenever their attention waned and used recordings to review material in preparation for assessments (Tarr et al., 2015; Hall & Ivaldi, 2107). Using a cost-benefit analysis, Taplin, Kerr and Brown (2013) even concluded that students would be willing to pay a reasonable fee to download their lecture recordings.

Methodology

One of the key aims of this study was to pilot and evaluate the benefits and challenges of using a new approach to Technology Enhanced Learning opportunities to engage large student cohorts in pre-class, in-

class and post-class activities. This research was based on a pilot study of 522 international students in two Monash College Diploma units, Introduction to Financial Accounting and Engineering Mathematics A.

It was decided this project would use the case study methodology as it is a particularly useful method when doing evaluation research. The case study approach is widely used in pedagogic research and allows the researchers the intention of further exploration of the ideas that are limited in the industry (Lokuge Dona, Gregory and Pechenkina, 2017). It also enables a holistic perspective of the experiences of both (Introduction to Financial Accounting and Engineering Mathematics) participant groups as a complex phenomenon (Patton, 2002a, 2002b). The ability to use new technology to engage international students from different disciplines and to present the findings could support other staff in understanding this experience and developing their own conclusions (Stake & Cisneros-Cohernour, 2000).

This case study drew on a combination of qualitative and quantitative data collection methods. However, these were limited to Monash College Diploma units and therefore limited to the context of this environment. Our main goal was to explore a method to engage international students who undertook complex subjects such as Introduction to Financial Accounting and Engineering Mathematics. With the course leader's approval, two units were selected for the pilot with the aim of drawing on data from the experience of teaching staff and students across two different disciplines, Business and Engineering. The Business Diploma and Engineering Diploma programs are a pathway into the second year of a Monash University business or engineering degree.

Students must be 16 years or over to enroll in these programs and have an IELTS band of no lower than 5.0. Academic entry requirements differ from country to country. The majority of students enrolled into these programs come from China. For the purposes of this case study the terms 'units' or 'courses' or 'subjects' are used interchangeably, and are defined as 13 weeks of instruction comprised of lectures and tutorials that are conducted face to face.

The Data

Data was gathered using qualitative and quantitative methods, including an evaluative student survey of the ALP usability, focus groups and semi-structured interviews. Two unit leaders and teaching staff also provided their perspective on their students' experiences.

The instrument used to gather the students' opinion of the pilot was through an online survey using Google forms. The survey instrument consisted of close ended and open-ended questions which enabled both depth and breadth of data collected (Krueger & Casey, 2014). The survey data was analysed using a mixed method approach (Bazeley, 2009, 2013; Creswell et al, 2003) that facilitated drawing in depth conclusions through the combined analysis of quantitative and qualitative data.

The survey was conducted with students at the end of trimester 1, 2016, prior to their examinations. Access to the survey was provided via a link in a class announcement on the Learning Management System (Moodle). The students were informed about the survey and that their participation was voluntary. No inducements were offered for providing feedback.

The survey contained eleven questions that aimed to elicit reflections from the students about: aspects of their learning behaviour, the use of the ALP for learning, their experiences using the ALP tools for interaction in and out of class and for assessing their progress, the use of the tools for students where English is their alternative language, students experiences using the technology for learning the unit content, and any suggestions for enhancements to the unit. The survey results were recorded in an anonymous manner and stored in a secure location.

A summary of findings from the student surveys has been presented in this report. It must be noted, despite the large number of students who were enrolled in these two units, only 42 participant responses were recorded. On reflection, the timing of the survey may have had a negative impact on gathering responses as it was distributed after the trimester classes were completed at a time when students were preparing for examinations. Although only a small number of participants responded to the survey, it has revealed some

important information to the Monash College team. As this project progressed throughout the year, more research was conducted into the student experience using the ALP and significantly more data was gathered.

The unit leaders were requested to journal their reflections (Dumay, 2014; Parkes, Dredger & Hicks, 2013) in addition to participating in focus group discussions. The unit leaders were requested to produce a summary report based on their work. Additionally, the continuous feedback throughout the trimester from the focus groups enabled the study to gain insights about the progress of the new approach and therefore to make small changes to the use of technology for the course delivery model.

The participants

In trimester 1 2016, the Introduction to Financial Accounting unit was conducted for the first time with 450 students (a double cohort). Of the 450 students, 171 of these students had no prior background in the subject area and the remainder had undertaken a prior unit of Introduction to Financial Accounting at a first year undergraduate level. The number of students enrolled in the Engineering Mathematics unit was 72. Introduction to Financial Accounting and Engineering Mathematics undergraduate students participated in this study as part of their first year of their degree program that they were enrolled. Key to the project were the two unit leaders who delivered these units. The students involved in the pilot ranged in age from 16 to 21 and were largely international students, mostly from the Asia region. The Engineering Mathematics group is made up of mostly males. The Introduction to Financial Accounting unit, has an equal spread of both males and females in the student body.

At the beginning of the trimester, the students were informed about the pilot and a disclaimer was displayed on the Learning Management System throughout the course to keep the students informed about the process. Student learning was supported in class by the unit leaders and guidance was provided regarding the new teaching and learning methodologies using the Active Learning Platform. To provide a fair and consistent approach, staff were advised that no formal assessments were to be conducted with the students using ALP during the pilot period.

Approach

The need for Technology Enhanced Learning opportunities had become increasingly evident in the organisation and trials were underway to understand the possibilities for engaging international students to increase academic performance. A no-obligation, free pilot of the Echo360 Active Learning Platform was offered by Echo360 to the organisation, and it was deemed a valuable opportunity by the eLearning and teaching teams to pursue. Teachers were trained to use the platform by the vendor, and were supported by the eLearning team throughout the pilot process.

Starting in trimester 1 of the 2016 academic year, the Active Learning Platform (ALP) was integrated to the Learning Management System (LMS), Moodle. As discussed by Moeed (2015) and Kwon, Saparova, and Hoffman (2015) this integration has allowed students who access the LMS to automatically have access to the Active Learning Platform; their lecture recordings, lecture presentations, and their notes. This integration also prevents teachers from having to upload their recordings to the LMS and then having to direct their students to another system to locate the recordings, therefore creating a richer learning experience (Zaharias & Pappas, 2016; O'Callaghan et al., 2017).

The two units that participated in the pilot were scheduled to take place in lecture spaces with the latest technologies (multiple wall mounted displays, a document camera, surround sound, and strong Wi-Fi). The lecture recordings were linked to the timetabling system that allowed automatic recording to take place at scheduled times.

Findings

Survey results

There were 42 participants who responded to the student survey, 25 (59.5%) were enrolled in Introduction to Financial Accounting and the remaining 17 (40.5%) were enrolled in the Engineering Mathematics unit. Reassuringly 90.4% of the survey participants indicated that they enjoyed using the ALP.

All of the respondents indicated that they used the platform to varying degrees; with the majority of respondents (40.5%) using the platform 2-3 times a week. This number appears to correlate with the scheduling of lectures and tutorials being 2-3 times per week, see Figure 1.
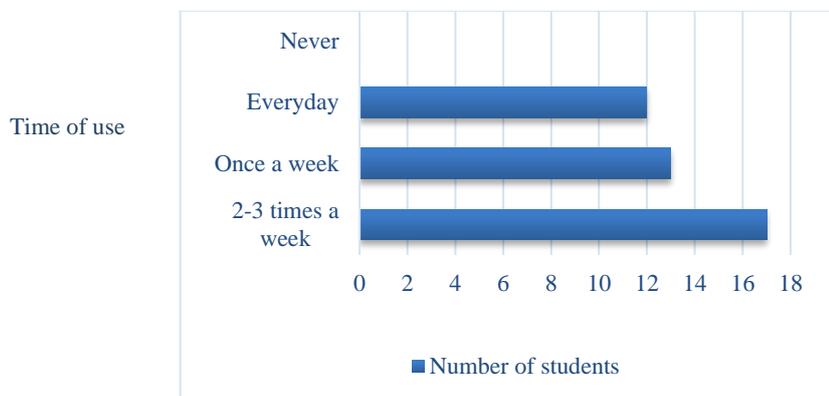

Figure 1: Student Utilisation of ALP (Weekly)

Although staff planned to provide a rich learning experience pre and post class, as shown in Figure 2, the data also revealed that students were using the platform it mostly during lectures (42.9%) and after lectures (42.9%).
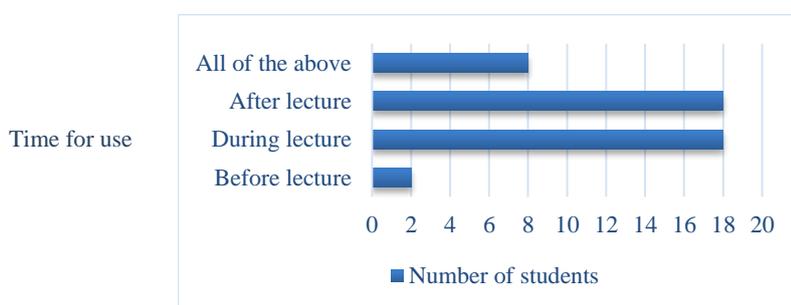

Figure 2: Student Utilisation of ALP (Pre-in-post lecture)

We were interested in students' perceptions of whether the ALP positively affected their study. A majority of respondents (57.1%) indicated they thought it did, a further 35.7% believed sometimes, 9.5% believed it did not help them study better. It is interesting to note that the 9.5% of students who thought the ALP did not help their study, is the same as the number of students who did not enjoy using the platform. It would be interesting to explore this relationship further to determine if there is a correlation between the two results. This finding is in line with the ideas that Al Kuwaiti and Subbarayalu (2015) revealed in their student experience surveys. However, Traphagan et al. (2009) and Phillips et al. (2010) suggest that more frequent access to recorded lectures leads to more positive results and learning behaviours, while Leadbeater et al. (2013) and Kwon, Saparova and Hoffman (2015) indicate that recorded lectures have little to no effect on student results. More research is needed to identify whether there is a correlation in use of ALP and students' performance.

The usability of the ALP (Figure 3) was another key area that required investigation. Students were asked to rate the usability of the platform and there was an interesting split in responses, the majority of students said it was easy to use but of particular interest was that 16.7% thought it was not easy to use. While these

numbers could be indicative of how different groups of students were supported to use the platform, what activities and tasks were expected to take place in and out of lectures, and other issues such as accessibility. It is worthwhile noting here, Henderson, Selwyn & Aston (2015) found that students would only re-use a system if it can be easily used.
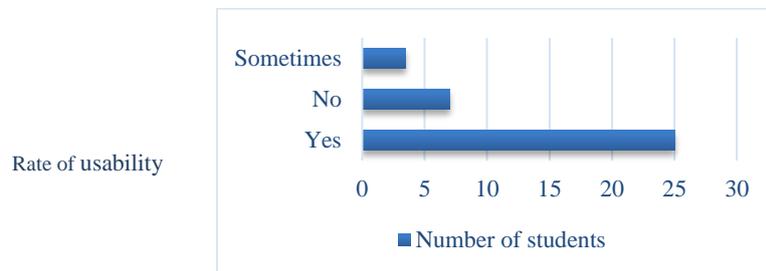

Figure 3: Student Usability

Students were also asked if they thought the ALP made their lectures easier to understand, of which 42.9% thought that it did, 35.7% of students thought sometimes it helped, and 21.4% stated that it did not. However, Bos, Groeneveld, Bruggen and Brend-Gruwel (2016) presented research results that indicated that students who use recorded lectures as a supplement, scored significantly higher than the students who only attended lectures. When students were asked whether they thought their lectures were made more interesting through the use of the platform, the majority of respondents (50%) thought sometimes it did.

When students were asked whether the use of the ALP encouraged them to attend lectures; an equal amount of students responded yes (38.1%) and answered no (38.1%). These results could point to the need for students to attend lectures being lessened by the fact that recordings are available for students to attend to when they choose (Lokuge Dona, Gregory and Pechenkina, 2017). Massingham and Herrington (2006) highlighted, that "students only attend lectures if they perceive value in them". This further indicates that having access to lecture recordings is unlikely to have an impact on class attendance unless the students do not value the content.

The researchers wanted to inquire into how certain features within the platform might support international students during a lecture. The students were asked if the ALP helped them to ask questions in lectures; a majority 43.9% agreed that it did, however 29.3% believed it helped sometimes, and similarly 26.8% felt it did not help. These findings are similar to Cole, Shelley & Swartz (2014), even though their research was mainly about online learners. A result of nearly 50% of survey participants is indicative enough to warrant further investigation into how specific tools within the ALP, such as the question/answer feature could provide avenues for students to actively engage with their lecturer during a lecture.

Regarding the system's 'helpfulness', of the total number of students surveyed, a majority of respondents (78.6%) indicated that they wanted access to the ALP for their other subjects, and only 21.4% stated they did not. This is consistent with findings from other studies indicating students' positive response to lecture-recording (Lokuge Dona, Gregory and Pechenkina, 2017). Furthermore, Henderson, Selwyn and Aston (2015) conducted research that also indicated the importance of having useful learning technologies that assisted students during their learning. Ouyang (2016), O'Callaghan et al. (2017) also indicated that it is the way in which students use learning technologies that create a better learning experience for them to progress in their learning. Several comments were made by students regarding a variety of benefits as shown in Figure 4.
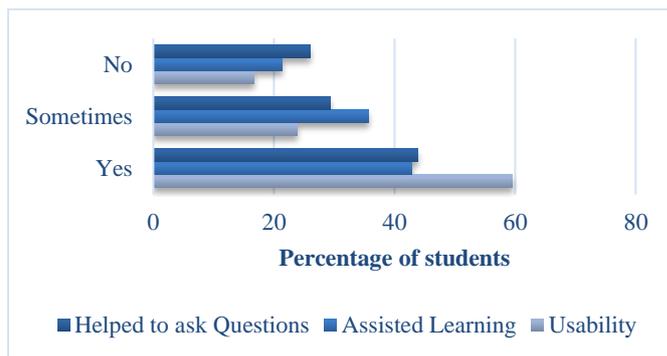
Figure 4: A comparison in ALP Usage

When students were invited to comment or make suggestions, some expressed their frustration about having to access the ALP via the Learning Management System to get to their lecture content. '*It is a useful tool but it is a little inconvenient to log into the ALP rather than see the lecture slides directly*.' Another student commented on the restrictive nature of only being able to access the tool in the online environment; '*ALP can be only used through internet. Lecture slides are more convenient and useful*'. This may have been due to their limited access to the internet. As mentioned before students will only pursue with using a tool if it is easy to access and use. This comment could also highlight the preference some students have for being able to download lecture PowerPoint slides for study purposes. Another comment was made regarding the lack of variety of question types being used in the lecture's interactive slides '*It is better to increase questions [types], not only the multiple choices*.' This may be due to the nature of content being delivered or the lecturer's hesitance to explore the other interactive activity slide options. One final comment that was made related to how the student's usability could be further improved '*if we can edit on slide like put add comment on slide or highlight would be better*'. This might be a useful recommendation to put forward to the vendor for future implementation.

Teaching Staff Feedback

The two unit leaders involved in the trimester 1 pilot were also asked to document their responses to three key questions: 1) what was done in trimester 1, 2016 using the Active Learning Platform? 2) What was the impact on students learning? 3) What changes are planned to improve students learning?

As to be expected with any introduction of Technology Enhanced Teaching and Learning system, there needs to be allowances made for changes in teaching practice by the users. Our staff used a combination of the platform with more traditional methods for content delivery. *"The lecture slides had blanks that the students were required to complete on their handout while I explained the concepts. After a few slides that covered concepts and theory on a particular topic, a few multiple choice questions were posted via ALP."* Both unit leaders reported using the interactive activity slides, (multiple-choice questions, true false questions, short answer) as one of the main methods to check comprehension. *"If the number of correct responses to a question was lower than expected, then I explained a similar type."* The unit leaders also found the 'confused button' helpful, to facilitate an environment that students could indicate what needed additional explanation. *"When the students became confused about the mathematical methodology, they simply clicked on the [confusion] flag ...this helped me to re-explain the concept."* Further, a unit leader referred to the benefits of having the content available for his students for revision purposes as one of the key impacts on his students learning.

Overall lecturer's perceptions towards the Echo360 ALP was positive. One unit leader explicitly commented on his students' results and the use of the platform indicating that: *"I believe that all of the above contributed to the increased pass rate of this unit in trimester, 2016."*

Research has indicated that use of technology to enhance students' learning has provided satisfactory results when it added value to the learning (Massingham & Herrington, 2006; Kong, 2015; Henderson, Selwyn, Aston, 2015).

Support Staff Feedback

The eLearning team members found the value of student tracking capability with the use of ALP analytics (Van Leeuwen et al. 2015). The data within the ALP provided insights of student's behaviour and added importance for teaching and support staff to provide additional attention to students at risk. The ability to conduct early interventions by identifying students who are not performing well and then to support them by contacting and directing them to support services is essential.

Providing training and ongoing support to the teaching staff was another major undertaking. Similar to when introducing a new system, the staff were supported through group, one-to-one training, and drop-in sessions. The pilot also linked staff to the college's IT support team, to create an environment that supports teaching staff to become the innovators.

The integration of the Active Learning Platform with the Learning Management System was initially quite challenging. The most demanding aspect was meeting the needs of multiple stakeholders, however with great support from all parties, solutions and interim measures have been implemented. One of the pending enhancements is to be able to link multiple group sections in the platform back to one Moodle unit, in order to cater for tutorial groups.

Limitations of current research

One limitation of the current research is that it only takes into account two specific courses with a limited number of students responding to the survey. A replication of the current research within different courses and a different student population is already under way and these results will enable a more general statement about the effect of ALP on student learning experiences and performance.

Another limitation of the current study is that it does not consider a more detailed individual use of the ALP and tracking of individual student behaviour and performance. It is not clear if students hold different views about the system compared to data on actual usage. It is currently not clear how different levels of access affect academic achievement. With more detailed insight into these individual differences, the possible influence on exam performance can be established on a more individual level.

Discussion and Conclusions

The aim of the project was to obtain a snapshot of the user experience of the Active Learning Platform. It appears that utilisation of the ALP for the selected units was an attractive approach and has enhanced students' progress. From a constructivist learning perspective, the use of the ALP in these units has facilitated opportunities for students to interact more with the lecturer and the content. In turn this makes the learning process much more student-centred. The use of the tools available in the ALP such as the question and answer function, the interactive polling activities, the confusion flag and notetaking function give students the capability to actively engage with content and to practice their understanding, in order to construct and reconstruct their knowledge. These tools also provide teaching staff some insight into this process in real time so they may address and readdress areas of confusion and take advantage of the opportunities to invite their students to engage further, both in and out of the lectures.

This is similar to the findings reported by Toppin (2011) who reports that a survey conducted at the University of Wisconsin-Madison concluded that undergraduate students value the webcasting of lectures and that, given the choice, would prefer a course in which lecture content is recorded over one that is not. The earlier studies about lecture recordings indicated that making recordings accessible and learning flexible has significantly enhanced students' educational experiences (McNaught, Lam, Chan, Yuen, & Ho, 2012; Toppin, 2011; Fei, 2014). Some studies specifically looked at how lecture-recording technologies support students from non-English linguistic backgrounds (Leadbeater et al., 2013; Pearce & Scutter, 2010) and reported the benefits of making the recordings available. Similarly, Monash College research findings highlighted 56.1% students indicated that the ALP assisted their learning. While there is no other research available about the capabilities specifically related to the Active Learning Platform, the use of other tools similar to the features of the ALP have recorded great success in enhancing students learning experience.

Lectures captured using the ALP with additional activities to engage students helped them to overcome weaknesses in areas such as taking notes, paying attention over extended periods of time, or dealing with annunciation challenges particularly faced by international students. The students in this pilot particularly found the ability to take notes alongside the slides quite useful. This was highlighted with 42.6% participants agreeing that, ALP helped them to understand difficult concepts and lectures content. Nearly all student respondents accessed and utilised the ALP at least once per week, however, 18% reported their usage pattern encompassed before, during and after class access per week. According to the pilot, the students pass rate increased in the Engineering Mathematics unit from 55% to 77% while the Introduction to Financial Accounting unit showed an increase in the pass rate by 10% indicating that the use of the ALP had an impact on student's performance, similar to Bos and his research findings (Bos et. al, 2015).

While this study has provided some evidence of the increase in student performance and engagement through the ALP, further research may assist in understanding how and why students use and enjoy using the platform. The correlation between technology-enhanced learning and the ALP has been positive, however, several other factors have influenced these results. Hence, it is important to conduct further research and exploration in this area in order to be able to derive firm conclusions.

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