Are online learning modules the kiss of life or death for lecture attendance?

Colin Kestell; Craig Willis; Steven Grainger and Dorothy Missingham.
The University of Adelaide, Australia
Corresponding Author Email: colin.kestell@adelaide.edu.au

BACKGROUND

In their original context, lectures were once the only means of disseminating scholarly work to the eyes and ears of an elite few. The evolution of the printing press however, resulted in more affordable books that empowered self-directed learning outside of the classroom. Lecturers could subsequently set pre-reading exercises, intent on establishing an early understanding of threshold concepts, so that motivated students would explore the subject matter more deeply. More recent technological advances have now similarly re-defined the contents of the learning toolbox for the contemporary student, with the Internet providing an effective conduit for the more prolific use of interactive learning and assessment software.

PURPOSE

Nevertheless, there is palpable concern amongst many academics that the increased use in these online resources might lead to reduced lecture attendance in institutions that still advocate the value of an on campus university experience. However, when considering the benefits of such flexible online learning conditions, the question posed in this paper is: Do the online and face-to-face (f2f) components of multi-mode delivery in a blended learning experience, mutually encourage the effective use of **both** in-person and digitally available resources?

DESIGN/METHOD

The online study habits of level-1 engineering students were observed when freely available online material became far more synchronised and pertinent to particular f2f lectures. Students were encouraged to utilise the online material in a timely manner, in preparation for quizzes that closed immediately prior to the lecture. Also, students were asked why they attended lectures and whether they thought the online resources added value to the f2f lectures.

RESULTS

It was observed that when the online material was freely available throughout the semester, and not synchronised to particular f2f lectures, the online resources were under utilised. However, once the students were encouraged to use relevant online resources in a timely manner, prior to f2f lectures, by closing the availability of a quiz beforehand, the use of the online resources increased dramatically without any adverse effect on lecture attendance. Students continued to perceive merit in the f2f lectures, as well as the online material, as long as both resources offered additional educational value.

CONCLUSIONS

The online and f2f components of multi-mode delivery in a blended learning experience *can* mutually encourage the effective use of both in-person and digitally available resources. Poorly attended lectures may therefore not linked to the more prolific use of online resources, but most likely the result of lectures perceived as boring, unappealing, or seen as offering no additional educational experience.

KEYWORDS

e-learning, mixed mode, threshold concepts.

Introduction

A lecture in its most traditional sense was once a narration of an expensively crafted literary masterpiece that would have only otherwise been available for the eyes and ears of an elite few. These monologues were once the crucial necessity in the dissemination of knowledge. However, as Guttenberg's invention of the printing press steadily evolved (Eisenstein, 1980), books became far more affordable and widespread, along with the lessons written therein. Motivated students were empowered to become far more erudite, through self-directed learning outside of the classroom, and lecturers were able to direct their students to 'pre-read' prior to attending a lecture, intent on making the face-to-face (f2f) opportunity far more interactive, by establishing an early threshold level of understanding. Motivated students would do so, but others might have ignored the advice and become lost in the occasion, perhaps because of conflicting, tiring and hectic lifestyles. To overcome the problem of overly tired students, balancing full-time work and their education, Novak and his colleagues took the concept of pre-reading further by requiring their students to submit a homework exercise prior to the lecture (Novak and Paterson, 1998). Their objective was to make lecture attendance a more active learning experience, in which their students were more engaged. Their idea became known as Just in Time Teaching (JiTT). While manually assessing these learning tasks, just in time, to define the salient issues for class discussion can be extremely challenging to a busy academic, the evolution of the Internet and advancements in online learning resources have helped to substantially lessen this burden (Novak *et al.*, 1999).

Online resources have totally redefined the learning tools of the contemporary student, when compared to those that were available to students of previous generations. One such tool, the Learning Management System (LMS) links lecturers and tutors to their students via the Internet, and provides a conduit for the use of interactive multi-media publishing software, such as *Articulate*, *Camtasia* or *Adobe Presenter*. These software suites offer benefits to JiTT, by integrating learning modules with automated formative and summative assessments, which can then provide an immediate responsive commentary, from which both the student and lecturer can reflect upon the students' level of comprehension (Kestell and Grainger, 2012).

Purpose

These online tools have been shown to have immense value in a learning arena which is now abundant with examples of both online and distance education courses, in which the complete on-campus delivery, and in-person learning experience has been totally, and very effectively replaced by well-structured digital media. But not all courses are likely to head this way, with many more traditionally focused institutions favouring multi-mode delivery for a blended student learning experience, which combines online teaching tools with on-campus and in-person pedagogy. Nonetheless, the possibility of such institutions favouring online delivery over an on-campus experience is causing some apprehension. There is profound concern amongst many academics that ask: *will a more prolific use of online resources lead to diminishing lecture attendance?* However, in light of the aforementioned benefits that online resources provide, a question of broader reaching significance would be:

> *Do the online and f2f components of multi-mode delivery in a blended learning experience,* **mutually** *encourage the effective use of* **both** *in-person and digitally available resources?*

The purpose of this paper is therefore to show that a strategically designed combination of online resources and f2f lectures, can lead to a richer holistic learning experience for students, in which both components of the blend actively encourage utilisation of the other. It is hypothesised that an important factor to this mutually supporting blend, is that the availability of the online material must be clearly synchronised to f2f sessions, particularly if the online material is intended to enrich the active learning elements of the f2f lecture. Otherwise students may wrongly perceive that they can put off accessing online resources

until the end of the course (to cram) and that these will be an adequate surrogate for the f2f experience.

Method

The comparison of student habits, when subjected to two variations of delivery (the second an evolved variant of the first) for a level-1 course, form the core of this hypothesis, which is further substantiated through qualitative student feedback. The method of delivery and resources that support the level-1 mechanical engineering course *Design Graphics and Communication*, has continually evolved to keep pace with the requirements of industry and the technology (computer aided drawing packages) that students must eventually use in their professional careers.

The most recent development in this course was in 2011, when the curriculum was presented online in narrated presentations with associated quizzes, with the intention of transforming the normal monologue of the traditional didactic lecture into a richer active learning environment, with the objective of improved student engagement and the development of an earlier understanding of crucial threshold concepts. However, the level of student engagement did not significantly improve, with students in crowded lecture theatres still hesitant to participate in discussion. It was postulated that students were not effectively using the online materials to adequately prepare for the lecture, but instead were hoping to find out what they needed to know from the f2f lecture alone.

In response to this, in 2012 the online quizzes were adaptively released so that they were only available prior to each relevant f2f lecture, which was more consistent with Novak's idea of assessed preparatory exercises.

As an added incentive for participation (rather than rely on the students perceiving each quiz as an opportunity for reflection on their own learning alone), each quiz contributed to 1% of the total mark for the course. The following section demonstrates how the inclusion of these quizzes resulted in an improved change in the students' online study habits, while also causing a positive effect on f2f lecture attendance and engagement.

Results

To investigate the change in student behaviour due to the variation in online delivery format between 2011 and 2012, the number of 'hits', i.e. times that students viewed the relevant online materials, were tracked with respect to time. For comparison, the data is shown for two online quizzes at weeks one and four of the 12-week course.

For 2011, Figure 1 indicates that only about one-quarter of the students initially responded to notification that an online introductory lecture was available. In a class of approximately 300 students, the online lecture recorded only 80 hits on the first day of the semester, with far less on the days following the initial f2f introductory lecture. This conservatively assumes that each engaged student viewed the lecture once, corresponding to a single hit. However, considering that some of these may have been conscientious students that accessed the material multiple times for clarification, the use of the resources was initially relatively poor.

This perceived lack of student engagement may be generally attributed to the normal week 1 chaos, and the poor communication that generally ensues. However, despite subsequently receiving ongoing advice that watching the online material would benefit their in-class learning experience, there was little improvement by week 4. The material pertinent to the planned learning schedule was made available on 9/08/11 at the beginning of week 3 (as soon as it was prepared), so that students had plenty of time to review it prior to the relevant week 4 f2f lecture that was scheduled for 17/08/11. While there were 121 hits on the first day and a total of 511 hits prior to the lecture (which could account for the entire class of 300 students), it could not be determined if these figures were heavily influenced by multiple views by the same students.
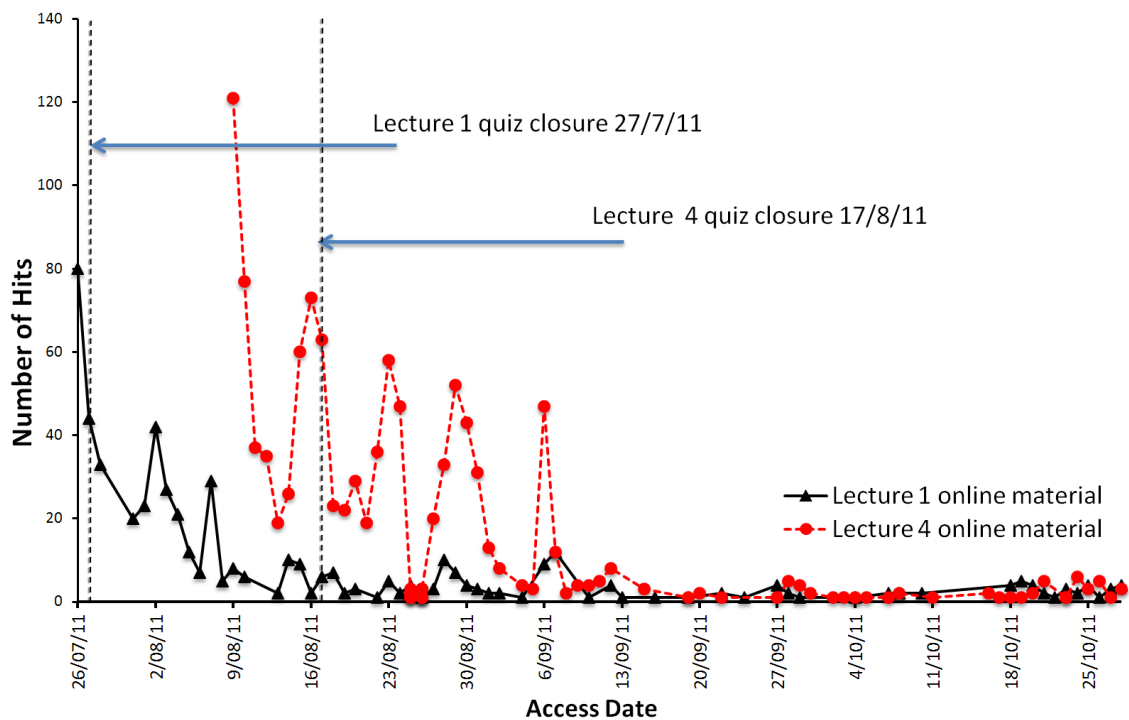
Figure 1: 2011 Level-1 student access to online material.

The most apparent conclusion was that some students were continuing to acquaint themselves with the online presentations *after* the lecture for revision purposes. However, the initial intent of the learning materials was for them to be viewed *before* the lecture to act as preparatory materials to develop the threshold understanding of students and then build on this assumed knowledge during the subsequent f2f lecture.

Regardless of how the 2011 figures might be interpreted (as either multiple hits per student, or the whole class viewing the online material), it becomes somewhat inconsequential when compared to the substantially improved viewing results obtained in 2012, which included the additional online quizzes accompanied by participation marks. Figure 2 shows the student access to the online learning material for the same course in 2012, which also provides the required knowledge for the newly introduced quizzes, which are closed immediately prior to the corresponding f2f lecture. It can be seen that the introduction of these quizzes (each worth 1% of the total course mark) dramatically affects the student interest in the online material. Between the time that the material was made available and the first f2f lecture, there were over 895 hits, around 75% greater than that for the Week 4 lecture in 2011, and an order of magnitude higher than that of Week 1. Although the quizzes were closed at the time of the f2f lecture, the online narrated presentations remained opened and continued to be accessed.

The topic of the week 4 lecture was considered to be an important threshold concept for the course, which some students traditionally meet with difficulty. The online presentations associated with this were therefore made available on 6/08/12, ten days prior to the scheduled f2f lecture of 16/08/12, when this concept would be elaborated upon through class guided discussion. In the time prior to the lecture, the online presentation was accessed 1395 times. While the material continued to be accessed after the f2f lecture (which are recorded), it was not with the same frequency as that shown prior to the quiz closure.

It was also observed that in both 2011 and 2012, lecture attendance remained consistent at approximately 80%. In 2012 however, students were more noticeably willing to ask questions and request that certain issues be further elaborated upon.
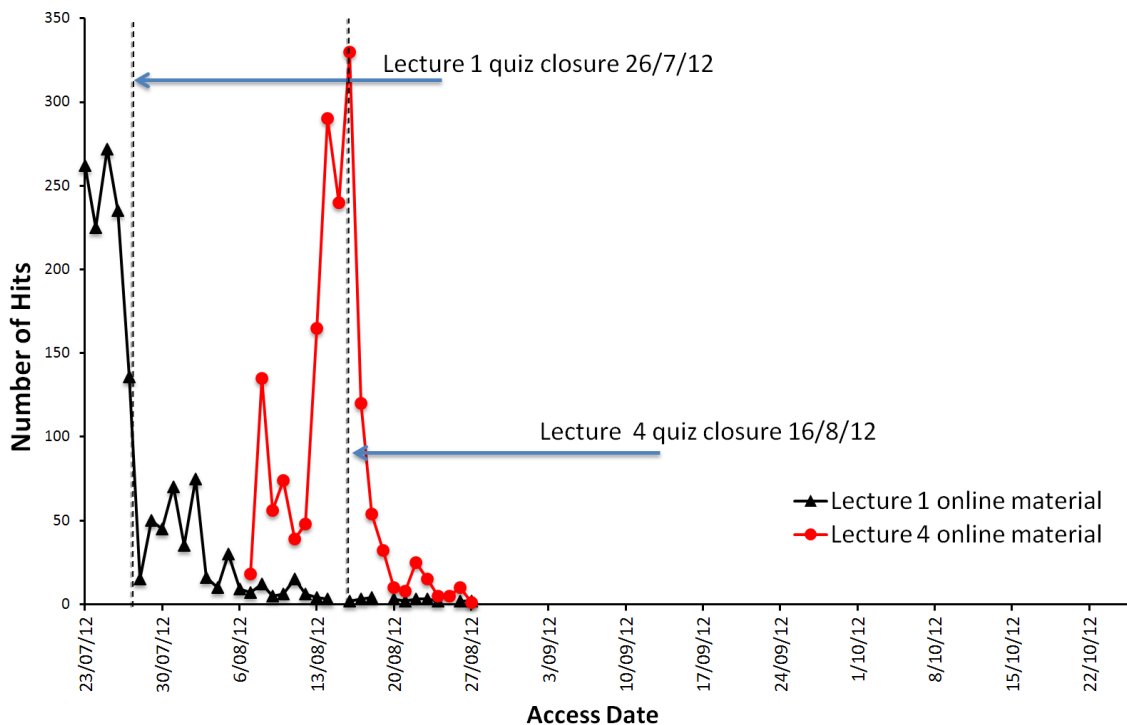
Figure 2: 2012 Level-1 student access to online material related to a time restricted quiz.

When asked why they still attended lectures (as part of an anonymous qualitative survey), despite the fact that these too also ultimately became an online resource once recorded, they gave the following insight:

- *The lectures provide an opportunity to ask questions, or listen to the questions other students might ask…*

- *I could just use the material online, but it is not the university experience that I signed up for...*

- *Yes we can watch and listen to the recordings, but it is not the same atmosphere as listening to, and watching you....*

- *It's not just the lecture. That motivates us to come in for sure, but there are the additional benefits of being here, such as studying in groups and making use of campus facilities....*

- *It establishes a good routine.*

- *I catch up with my friends.*

When asked about the online resources, student responses included:

- *...the online lectures and demonstrations were helpful, I wish more lecturers did this. After watching the demos, I was more confident about asking questions in class.*

- *…I looked forward to attending the lectures after seeing what it was all about.*

- *…when I was sick it was good to go through the learning modules and then watch the recording of the lecture.*

Discussion

These results highlight a number of issues, but most importantly contradict the notion that a more prolific use of online material directly reduces lecture attendance. Jones (2009) suggested that the use of contemporary teaching tools (such as online resources) can still be perceived by many academics as radical, high risk and is consequently in real danger of being used minimally and inappropriately. The risk of minimal use was also observed in a survey conducted by Grainger *et al.* (2011). The effect of inappropriate use can be observed in this research, where the 2011 cohort were not accessing the online material as envisaged,

which in turn adversely affected the intention of improving interaction in the f2f lectures. Cramer *et al.* (2006) refer to this as a "service access gap" in which students do not make proper use of the available online resources if they perceive that it offers no more educational value than that from the f2f lecture. In their example, they determined that lecture attending students were unlikely to utilise online recorded material, but nonetheless considered recorded lectures as valuable for students who might not be able to attend. This highlights that where online material simply offers a repeat of the f2f lecture, there is a real risk that either resource might be poorly utilised.

Sharing the goals of this study, Goldberg *et al.* (2006) also posted their lectures online so that they could make more interactive use of their student and staff contact time in a more engaging atmosphere. While the analysis of their data could not quantitatively indicate improvement in grades, they did not observe any degradation. One qualitative observation however, that supports the results of this paper, was that their staff felt far more empowered to interact with students, and that students were far more engaged, spending more time to reflect upon the issues at hand towards a richer and deeper understanding of the syllabus. McFarlin (2008) did observe quantifiable improvement in student performance through the introduction of a blended learning combination of online and f2f lectures (similar to the methods reported in this paper). While they observed that the average exam mark increased by nearly 10%, it remains unclear if this was directly attributable to the revised pedagogical methods, or the variability of cohort quality from one year to the next.

Students need to see clear added educational value in any resource that they use. Clearly the positive impacts on student participation observed in this study can, in part, be attributed to the online quizzes being linked to their summative assessment. Regardless of the initial motivation, research by Koskela *et al.* (2005) concluded that students who made use of e-learning resources, in addition to attending lectures, significantly outperformed students that only attended lectures. Importantly however, they also emphasise that the online material and lectures must be clearly mutually beneficial if they are to provide the correct blend of multi-modal delivery. As was observed in this research, this mixture requires more than the mere selection of the correct ingredients alone, but due consideration of how and when the components collectively combine and complement each other is crucial. The 2011 results in this study showed that material that is available throughout the semester is poorly utilised, even if there is an expectation for it to be accessed prior to a particular lecture. However, when there is an added incentive (such as the time restricted quizzes in the 2012 offering of the same course), students accessed the information in a timely manner, and used it to allow more interaction in the pertinent f2f lectures.

It is therefore apparent that if lecture attendance is diminishing, then it is likely to be caused by other factors. Gysbers *et al.* (2011) concluded that a boring style of lecturing and an uninspiring subject matter is most likely to be the real reason for falling lecture attendance. Lectures must therefore, first and foremost, be interesting and enjoyable if they are to attract and retain the attention of students (Kestell and Missingham, 2006). Hadgraft (2007) also observed that very little has changed in the way in which engineering is taught, with a clear disparity between the qualified engineers perception of it as an exciting profession, and the student body believing that the educational process is "something that must be endured rather than enjoyed". He reports that students "are turning away from our lectures in droves" because they believe they are boring, not because of the availability of online resources. Hadgraft continues by calling for a change that embeds computer aided learning, and a far more effective use of online resources into our teaching; the very technology that we engineers have developed.

Conclusions

In conclusion, the use of online material and narrated presentations that cover the syllabus of a level-1 engineering course had no adverse effect on f2f lecture attendance, with students still perceiving there to be value in the on-campus, in-person experience. The study did

however show that if the online material is not carefully synchronised with f2f lectures, and students are not provided with an obvious incentive to make use of this material, then it is the online material itself that might be poorly utilised. When preparatory online material is made available at an appropriate time, synchronous with f2f lectures, and a quiz used as an incentive for students to utilise it, students are able to reflect upon their understanding of the relevant threshold concepts prior to interacting with the lecturer, thus enriching the holistic learning experience. This technique permits a more relaxed, less formal f2f lecture structure, which can include question and answer sessions to help improve the students' comprehension, and their ability to synthesise and evaluate what they know. The online and f2f components of multi-mode delivery in a blended learning experience *can* therefore mutually encourage the effective use of both in-person and digitally available resources. Poorly attended lectures are therefore most likely the result of issues unrelated to the more prolific use of online resources, but because such lectures are perceived to be unappealing.

References

Cramer, K.M., Collins, K.R., Snider, D. and Fawcett, G. (2006). *Virtual Lecture Hall For In-Class and Online Sections: A Comparison Of Utilization, Perceptions and Benefits*. Journal of Research on Technology in Education; Summer; 38 (4) pp 371- 381.

Eisenstein, E. (1980). *The Printing Press as an Agent of Change. Volume 1*. Cambridge University Press.

Goldberg, H.R., Haase, E., Shoukas, A. and Schramm, L. (2006). *Redefining Classroom Instruction*. Advanced Physiology Education, May 2006 30 (1), pp 124-127.

Grainger, S.D., Kestell, C.D. and Willis, C.R. (2011). *Staff and Student Perceptions of the Effective Use of Contemporary Lecture Theatre Technology*. Proceedings of the 2011 AaeE Conference, Fremantle, Australia.

Gysbers, V., Johnston, J., Hancock, D. and Denyer, G. (2011). *Why do Students still Bother Coming to Lectures, When Everything is Available Online?* International Journal of Innovation in Science and Mathematics Education, 19(2), pp 20-36.

Hadgraft, R. (2007). *It's time for a coordinated approach to computer-aided learning and assessment*. Proceedings of the 2007 Australasian Association for Engineering Education Conference, Melbourne, Australia.

Jones, D. (2009). Small changes in "Lectures". http://davidtjones.wordpress.com/2009/09/28/small-changes-in-lectures-ustream-votapedia/ Retrieved on 1/8/2012

Kestell, C.D. and Missingham, D. (2006). *A Funny Thing Happened on the Way to the Lectern*. Proceedings from the 17th Annual Conference of the Australasian Association for Engineering Education, Auckland, New Zealand.

Kestell, C.D. and Grainger, S.D. (2012). *The Transition to Multi-Modal Delivery in Applied Mechanics Education*. Proceedings from the 7th Australasian Congress on Applied Mechanics. Adelaide.

Koskela, M., Kiltti, P., Vilpola I. and Tervonen, J. (2005). *Suitability of a Virtual Learning Environment for Higher Education*. Electronic Journal of e-Learning, 3(1), pp 21-30.

McFarlin, B.K. (2008). *Hybrid lecture-online format increases student grades in an undergraduate exercise physiology course at a large urban university*. Advanced Physiology Education, March 2008; 32 (1): 86-91.

Novak G. and Paterson, E. (1998). *Just in Time Teaching: Active Learner Pedagogy with WWW*. Proceedings from the International Conference on Computers and Advanced Technology in Education, Cancun, Mexico.

Novak, G. M., Patterson, E. T., Gavrin, A. D. and Christian, W. (1999). *Just in Time Teaching*. Prentice–Hall, USA.

Copyright statement