# Online lecture recordings and lecture attendance: Investigating student preferences in a large first year psychology course

**Alexandra Yeung**
Department of Chemistry, Curtin University, Perth, Australia
Institute for Innovation in Science and Mathematics Education, University of Sydney, Sydney, Australia
*alexandra.yeung@curtin.edu.au*

**Sadhana Raju**
School of Psychology, University of Sydney, Sydney, Australia
*sadhana.raju@sydney.edu.au*

**Manjula D. Sharma**
School of Physics, University of Sydney, Sydney, Australia
*sharma@physics.usyd.edu.au*

## Abstract

*While blended learning has been around for sometime, the interplay between lecture recordings, lecture attendance and grades needs further examination particularly for large cohorts of over 1000 students in 500 seat lecture theatres. This paper reports on such an investigation with a cohort of 1450 first year psychology students' who indicated whether they frequently attended lectures or not. The division helped ascertain differences and similarities in preferences for using online recordings. Overall, non-frequent attendees were more likely not to use lecture recordings (48.1%) to make up a missed lecture than frequent attendees (34.3%). Surprisingly, in the last week of semester, 29% of students reported not yet accessing lecture recordings. Students had the intention to use lecture recordings as they envisaged these to be helpful for learning and commented that they would be adversely affected if recordings were not available. In fact, students are passionate about lecture recordings. Analytics show that after Lecture 7, each lecture recording attracted 600 or less unique visits (hits) supporting the finding that most students make strategic use of learning resources available within the blended learning environment.*

## Introduction

Web-based lecture technologies (WBLT) digitally record lectures for students to access on demand. *Lectopia* (now known as *Echo360*), a lecture capture and delivery system, is an example of this type of technology. Since their introduction some ten years ago, there have been dramatic advances in technology, leading to increased use of WBLT, to the extent that they are the norm in some contexts. Students are also increasingly more comfortable with technology, expecting technology to be integrated into their learning environments. What has changed from the early studies? Have more students stopped attending lectures and are they using lecture recordings more? This is particularly pertinent for large cohorts of more than 1000 students where each lecture hall can accommodate more than 500 at a time. Do those students prefer lecture recordings to face-to-face (F2F) lectures? Are the preferences of students who indicate that they frequently attend lectures different to those who don't frequently attend lectures? Studies have also reported a tension, staff perceive that increasing availability and easy access to recorded lectures have reduced student attendance at F2F lectures and negatively affected learning (Davis, Connolly, & Linfield, 2009; Phillips, Gosper, McNeill, Woo, Preston, & Green, 2007). For example, 41% of

the lecturers surveyed by Williams and Fardon (2007a) perceived a drop in attendance of more than 25% with the introduction of recorded lectures. This paper sheds light on students' preferences, frequencies of, and reasons for using lecture recordings and attending lectures in a large first year psychology cohort.

## Background and context

WBLT offer the opportunity to diversify students' learning experiences by adding variety to existing teaching strategies. Furthermore, WBLT are reasonably robust, have advanced capabilities and are familiar to both staff and students. For courses with large enrolments, making lecture recordings readily available makes it justifiable to retain lectures of more than 500 students since students who require flexibility or find online learning more conducive can opt to use the recordings. In fact, certain capabilities such as the ability to tag and repeat certain segments make WBLT particularly appealing. Responding to such drivers, educators are blending delivery modes as they strive to provide a sound education (Lefoe, Olney, & Herrington, 2008).

The popularity and use of WLBT has been growing (Gosper, Green, McNeil, Phillips, Preston, & Woo, 2008, Venema and Lodge, 2013). The growth is justified by the changing nature of student life, which often includes part-time work, sporting commitments or family responsibilities (Alexander, 2007; Krause, Hartley, James, & McInnis, 2005). According to a study by the Australian Vice Chancellors Committee, 71% of Australian students undertake paid employment during semester, working an average of 15 hours a week (Australian Vice Chancellor's Committee, 2007, 2012) although Anderson (2006) reported that 78% of Australian university students found paid employment impacted detrimentally on their study. A similar trend was reported in the United Kingdom (Brennan, Duaso, Little, Callender, & van Dyke, 2005). WBLT allow students with other commitments to access learning resources at any time (Fardon, 2003). Even more profoundly, learning experiences that have traditionally been available only in the F2F mode at particular times are now available at any time via WBLT. Students have flexibility, but also exercise more choice over their learning. Students can "make up a missed lecture" by watching recorded lectures (Vajoczki, Watt & Fenton 2011). The flexibility and choice places more responsibility on students who intend to use WBLT, to actually do so (Hood, 2013). In other words, the ability for students to review content covered in F2F lectures in their own time and pace is particularly important, especially for students with learning difficulties or English as an Additional Language (EAL). Do students who attend lectures more often use WBLT less? Such comparisons are rare in literature especially for cohorts of more than 1000 students. Obtaining attendance data is also problematic in realistic contexts. Consequently, our study uses survey methodology to investigate student preferences for use of WBLT and F2F learning opportunities comparing students who indicate that they attend lectures frequently with those who do not.

A number of studies have found positive benefits of lecture recordings. McElroy and Blount (2006) surveyed second year accounting students and found that 75% of the 411 respondents agreed that lecture recordings enhanced their learning. Similarly, in a study conducted in Singapore with 1160 students from multiple courses and year levels, Soong, Chan, Cheers, and Hu (2006) found that 95% agreed that lecture recordings were useful to their studies. Research has persistently found that students mainly use recordings for revision and examination preparation (Copley, 2007; McElroy & Blount, 2006; McNeill, Woo, Gosper, Phillips, Preston, & Green, 2007; Williams & Fardon, 2007b).

On the other hand, Phillips et al. (2007) reported that students' positive perceptions of recorded lectures do not align with staff perceptions. There is concern that the increasing availability and easy access to recorded lectures has reduced student attendance at F2F lectures, negatively affected learning (Chang, 2007), and reduce class interaction, particularly for shy students (Mark, Vogel & Wong (2010). McKinlay (2007) found a 10-33% drop in lecture attendance after the introduction of lecture recordings calling it the "vanishing student trick" (cited in Taplin, Low, & Brown, 2011). However findings are not consistent. Other studies have shown that introduction of lecture recordings is not associated with a decline in lecture attendance (Copley, 2007; Larkin,

2010; Scutter, Stupans, Sawyer, & King, 2010; von Konsky, Ivins, & Gribble, 2009; Fei, Mather, Elmer, Allan, Chin, & Chandler, 2013). White (2009) used *iclickers* in his first year biology course to monitor lecture attendance over five semesters.  During this period, he introduced lecture recordings, finding that the average attendance rate amongst the cohort of 150 to 200 students remained around 75%. Similarly, Bongey, Cizadlo, and Kalnbach, (2006) and Hove and Corcoran (2008) found that the availability of lecture recordings did not lead to a decline in attendance, instead students used online lecture recordings to support or supplement F2F teaching. Von Konsky et al. (2009) recorded week-by-week lecture attendance, frequency of lecture downloads and students' perception with similar results.

The link between attendance and academic performance following the introduction of WBLT is unclear with mixed results (Leadbeater, Shuttleworth, Couperthwaite, & Nightingale, 2013; McCredden & Baldock, 2009).  Massingham and Herrington (2006) demonstrated that academic performance was negatively correlated with non-attendance. They suggested that students who do not attend lectures miss out on opportunities to participate and only engage superficially with content available via lecture recordings. On the other hand, with third year students in accredited degree programs in computer science, information technology and software engineering, von Konsky et al. (2009) found that there was no direct correlation between lecture attendance and final marks.

Despite tenuous, unclear and often contradictory findings, what is clear is that lecture recordings are becoming increasingly prevalent and that they do offer advantages such as flexibility and choice.  In parallel, lectures are persisting, including the very large lectures.  While researchers are beginning to investigate student intentions to access, and motivations for accessing various resources from the "learning buffet" (Hood, 2013), comparisons of students who frequently attend lectures with those who do not are rare.  Within this context, our paper addresses the following research questions:

- How often do students report attending lectures?

- Do the preferences of frequent and non-frequent lecture attendees differ, and why?

- Do students report using lecture recordings to make up a missed lecture?

- Do students find lecture recordings useful for learning?

- Is there a difference in grades for frequent and non-frequent lecture attendees?

## Methodology

### *Structure of the subject*

The study was conducted in a first year undergraduate Psychology subject at The University of Sydney. This subject was presented as three 1-hour lectures and a 1-hour tutorial each week over the 13 weeks of semester. It covered six topics – perception, learning and motivation, abnormal psychology, emotion, human mental abilities, and cognitive processes. Lecturers used PowerPoint slides, which were placed on the learning management site, *Blackboard,* used by the University for providing learning resources to students for each course they are enrolled in. Often the PowerPoint slides had further links to resources.  If the slides were viewed via *Blackboard*, the viewer was responsible for accessing those resources. Use of the resources during lectures was at the discretion of the lecturer. During the lectures, *Lectopia* was used for audio recording which were also placed on *Blackboard*, but were not synchronised with the PowerPoint slides. There was a deliberate decision to not have concurrent audio and PowerPoint capture during lectures as the

resources included videos and images, which were often sensitive and had copyright implications. The PowerPoint slides and audio recordings were made available progressively on *Blackboard* as the course unfolded. Across the Faculty, recorded lectures were being rolled out in other subjects, hence this technology was familiar to many students.

### Instrument and analysis

A survey of 25 questions based on Gosper et al.'s (2008) study was developed. The first 7 questions sought demographic information and several asked for open-ended responses.

Across the Faculty, students lecture attendance is not recorded, hence it was not viable to make use of this option without biasing the results. Consequently, we had to find a creative solution to the question: Which students attend lectures frequently and which do not? Simply counting numbers in the lecture theatre would not answer this question. We asked students to indicate how often they had attended lectures by selecting one of the following: (a) almost always, (b) frequently, (c) about half the time, (d) sometimes, (e) rarely, or (f) almost never. Since the subject has six topics of equal length, students selected their attendance for each topic. This was deemed important so as to eliminate bias. For example, students could be attending more lectures in particular topics that interested them or were delivered by popular lecturers. The overall distribution was similar across each of the six topics (examined using Chi square tests (Sanger, 2008)), hence, a composite score of overall attendance was created by averaging the self-reported attendance over the six topics for each student. The sample was split into 2 categories: those who indicated attending about half or fewer lectures (non-frequent attendees) and those who attended frequently or always (frequent attendees). The free response answers were generally analysed using content analysis to determine themes in student responses (Buntine & Read, 2007; Miles & Huberman, 1994; Silverman, 2005).

### Procedure

The survey was delivered online and administered in the last tutorial of the semester. Students were given an information sheet in compliance with the Human Research Ethics protocols. Those students consenting to participate completed the survey via *Blackboard*. The analytics embedded in *Blackboard* provided data on the number of hits on each lecture recording but did not link these with individual students. At the end of the semester, data from the survey was linked to students' final grades in a multiple-choice exam.

### Sample

A total of 1450 students were enrolled in the subject, 1022 consented and completed the survey. The majority (88%) reported being in the first year of their degree and, of these, 79% reported having English as their first language. Sixty-seven per cent were females. Students were generally undertaking diverse degrees such as Science, Arts, and Law and were all on-campus students. Since different numbers of students answered each question, the number of respondents for each question is reported throughout the paper.

# Results

- *How often do students report attending lectures?*

Of the 948 respondents for the attendance questions, 39% reported attending half or fewer lectures, while 61% indicated attending frequently or always (see Figure 1). These figures are similar to Gosper et al. (2008) where 56.2% of students reported frequently attending lectures and Gysbers, Johnson, Hancock, and Denyer (2011) where 6% reported never attending lectures. However, these figures are lower than those reported by Larkin (2010) who noted an average attendance of 84% with 64 third year students and White (2009) who reported 75% attendance with *iclickers*. The point to note is that, over the years, around half the students consistently report frequently or always attending lectures.
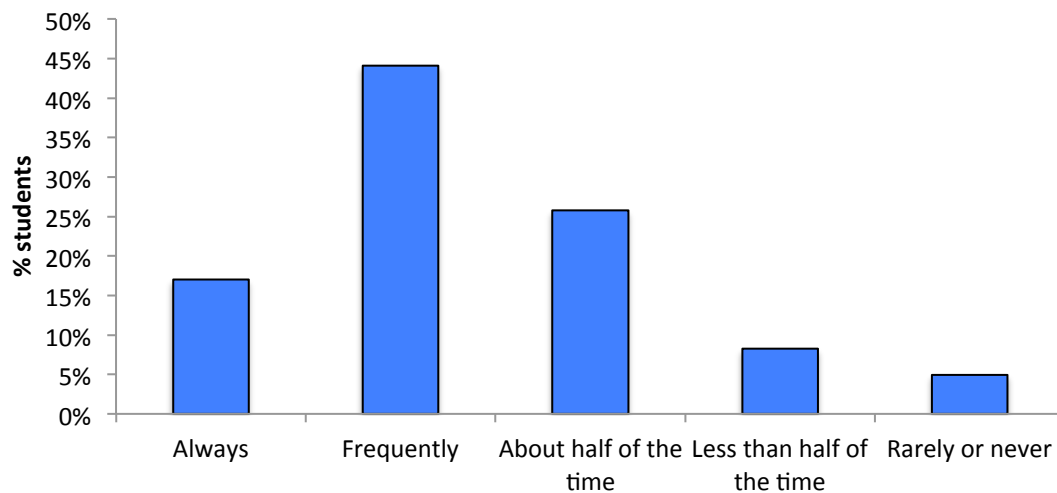


*Figure 1.*        Distribution of students' lecture attendance (n=948)

Students were divided into two lecture attendance categories:

i.   Non-frequent attendees - those who indicated attending half or fewer lectures (*n=369* students)

ii.  Frequent attendees – those who indicated frequently or always attending lectures (*n=579* students).

- *Do the preferences of frequent and non-frequent lecture attendees differ?*

The claim is often made by colleagues that if responses from students who do not attend lectures are included when probing why students do attend lectures, the findings are conflated. Consequently, we asked students to select one or more reasons for attending lectures in the following way: "*Answer the following question if you REGULARLY attended face-to-face lectures. I attended face-to-face lectures in this Unit because ...*".  Of the 789 respondents to this question, 569 were frequent attendees and 220 were non-frequent attendees. There were some contradictions in that some non-frequent attendees answered questions tagged for those who regularly attended lectures, while some frequent attendees answered questions for those who did not regularly attend lectures. However, this provided an opportunity for comparison. It is interesting to note that most students selected multiple reasons, possibly indicating that lectures provide a multifaceted

experience. For the frequent attendees, we calculated the percentage of students who selected each reason. The same was done for the non-frequent attendees. Figure 2 shows the percentages selecting each reason. Since the question was framed for those who regularly attend lectures, the percentages are larger for the frequent attendees. In Figure 2, the first 4 items, around social interactions, had the smallest differences between the non-frequent and frequent attendees and also had somewhat lower percentages. The next five items, around particular facets of the lectures, have larger differences. The last group of items are around logistics. One of these is the only reason that has a reverse percentage response; *I was on-campus anyway*. We also note that some 52.3% of the non-frequent attendees indicated *I wouldn't have got around to listening to the lecture recordings*. This is a dilemma since there is a group of students who report not frequently attending, but select regularly attending lectures because they would not get around to listening to lecture recordings. Finally, in general, the reasons are consistent to those found in previous studies where similar questions were asked (Gosper et al., 2008; Gysbers, Johnson, Hancock, & Denyer, 2011).
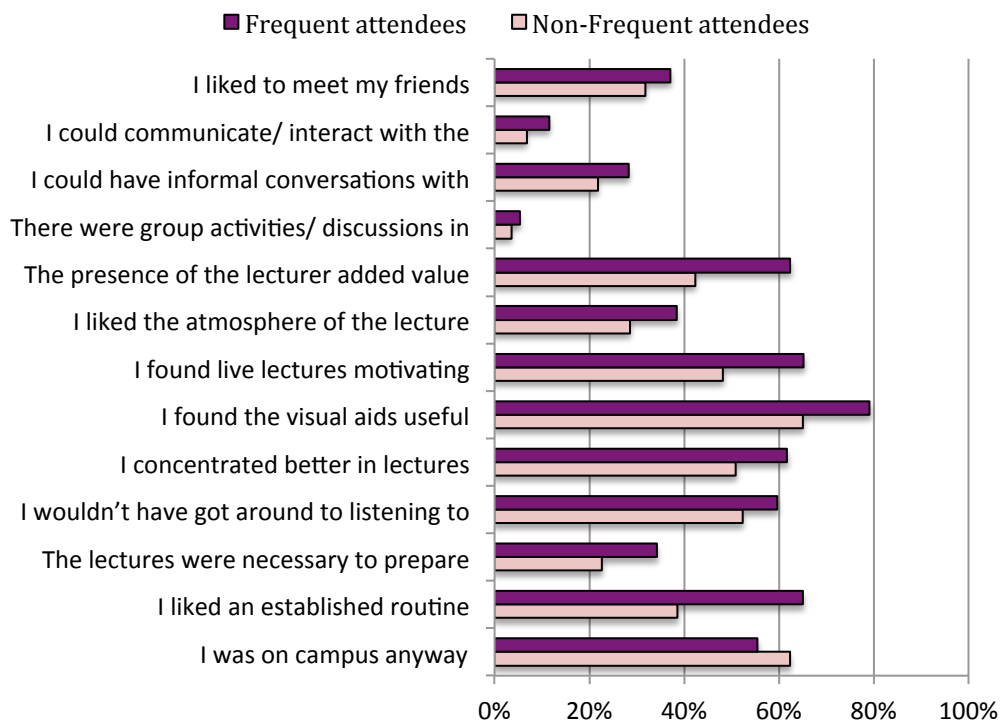


*Figure 2*: The percentage of students from each category, frequent (*n*=569) and non-frequent (*n*=220) attendees who selected each reason for attending lectures. Students could select more than one reason.

Along the same lines, students who did not regularly attend lectures were asked to select one or more reasons for why they did not attend lectures. Of the 342 respondents to this question, 233 were non-frequent attendees and 109 were frequent attendees. Figure 3 shows the percentages from each category selecting each reason. Again students chose multiple reasons. Since the question was framed for those who regularly do not attend lectures, the percentages are larger for the non-frequent attendees. The reason *I was not able to attend* has a reverse percentage response, indicating that frequent attendees would have attended lectures if they were able to do so.
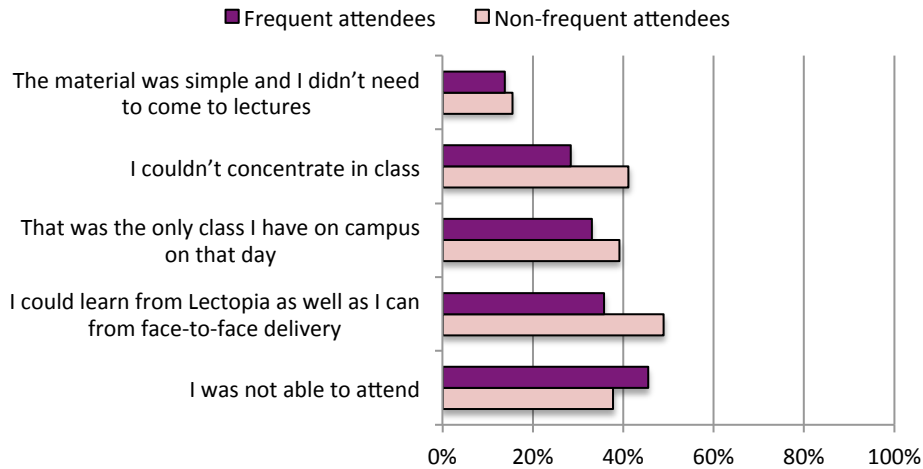
*Figure 3:* The percentage of students from each category, frequent (109) and non-frequent (233) attendees who selected each reason for not attending lectures. Students could select more than one reason.

When comparing Figure 2 with Figure 3, two features are of note. First, that the percentages are reversed, that is the frequent attendees prefer F2F lectures for certain reasons more than the non-frequent attendees and vice versa. Second, the percentages for Figure 2 are higher than those for Figure 3. In other words, around 50% of the non-frequent attendees whose responses are included in Figure 2 preferred lectures because they *found live lectures motivating* and *concentrated better in lectures*.

- *Analytics of Lectopia use – Do students report using Lectopia to make up a missed lecture?*

The analytics embedded in *Blackboard* provided data on the number of unique visits (hits) on each lecture recording. These were not linked with individual students, see Figure 4. The hits declined as the semester progressed. The first lecture attracted 841 hits while the final lecture only received 363 hits. This is in contrast to White (2009) who found increased hits just before assessments. Bell, Cockburn, McKenzie, and Vargo (2001) found that students often intend to use online resources, as they are readily available, but may never end up doing so.
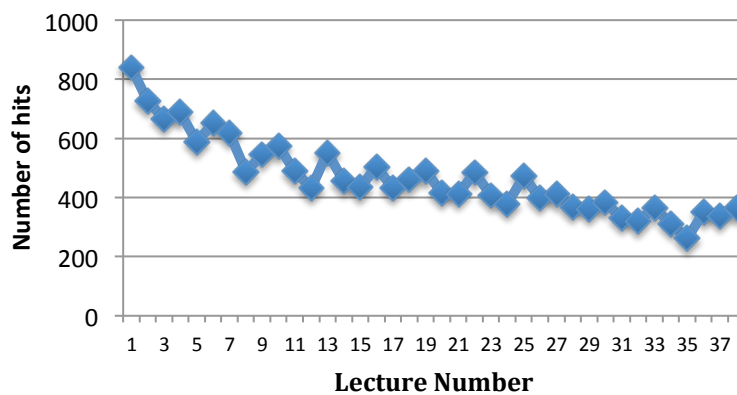


*Figure 4.*      *Number of unique hits on Lectopia throughout the semester for the 39 lectures*

Figure 4 indicates that some students are using *Lectopia* with most lecture recordings receiving more than 300 hits from the class of 1450 students. This raises a question: do students use *Lectopia* to make up missed lectures? Question 13 of the survey asked students exactly that. Figure 5 shows a distribution of how often *Lectopia* is used to make up a missed lecture amongst frequent and non-frequent attendees.

Chi-square analysis indicates that the distributions are different ($\chi^2$=547, df=5, p<0.01), a greater proportion of non-frequent attendees *rarely* or *less than half the time* use *Lectopia* to make up a missed lecture, while a greater proportion of frequent attendees *always* used *Lectopia* to make up a missed lecture. Overall, non-frequent attendees were more likely not to use *Lectopia* (48.1%) to make up a missed lecture than frequent attendees (34.3%). These overall figures are consistent with Larkin (2010), who found greater than 50% of respondents infrequently used lecture recordings and only 36% used lecture recording when they were unable to attend a lecture. Leadbeater, Shuttleworth, Couperthwaite, and Nightingale (2013), also found that approximately 50% of the respondents used lecture recordings.

Reasons for not making use of lecture recordings include the visual elements not being captured in the recordings, podcasts were not available on a mobile/portable device, and the visual and audio parts of the lectures were not synced, thereby making them hard to follow. Students who did access *Lectopia* to make up a missed class, had a follow-up question asking when they would normally do so. The greatest proportion of students (40%) used *Lectopia* a few days after the lecture, some (22%) a week or two later, while only a small proportion (9%) on the same day. Surprisingly 29% of respondents had not using *Lectopia* yet. When asked which features from a checklist would enable more use, the most popular were capturing visual elements, synchronisation of audio and PowerPoint, and podcasting.
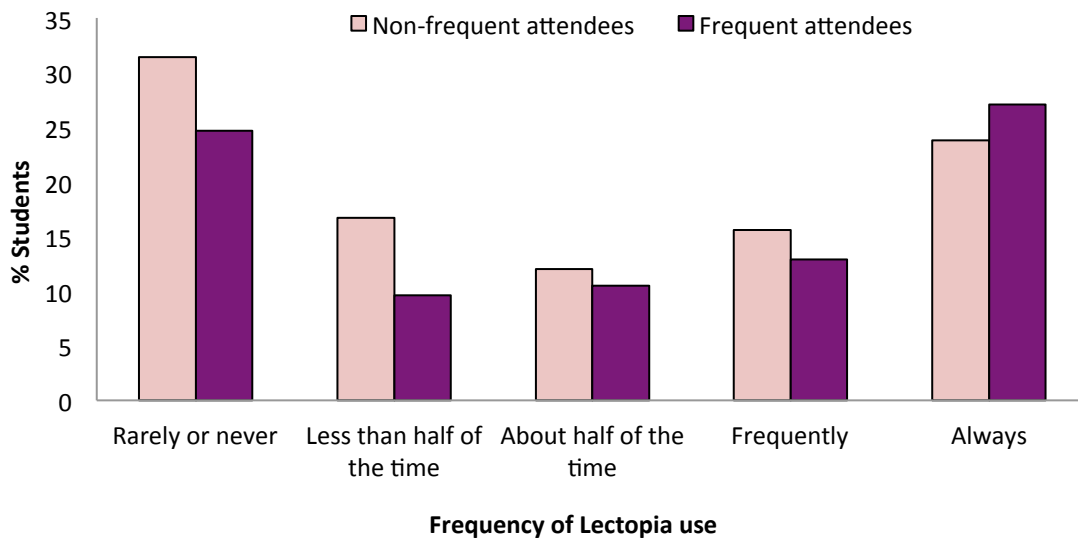


*Figure 5*. The percentages of frequent and non-frequent attendees indicating how often they use *Lectopia* to make up a missed lecture (n=925)

- *Do students find lecture recordings useful for learning?*

Similar to Gosper et al.'s (2008; 2010) study, students were asked

- *In general, do you think using Lectopia makes it easier for you to learn?*

- *In general, do you think using Lectopia has helped you to achieve better results?*

Students could select from the 5 options shown in Table 1. Since the same questions had been asked by Gosper et al.(2008), a comparison of the percentages shows if student perceptions have changed. While trends are similar, and WBLT are perceived as being useful as learning tools, our results show a shift towards 'not sure'.

Table 1
*Comparison with Gosper et al. (2008) of student responses about their learning and Lectopia use*

| Response | Do you think Lecotpia makes it easier for you to learn? | | Do you think Lecotpia helped you achieve better results? | |
|---|---|---|---|---|
| | Our study | Gosper et al. (2008) | Our study | Gosper et al. (2008) |
| *Yes* - in a significant way | 36.32% | 47.1% | 27.83% | 35.1% |
| *Yes* - in a moderate way | 34.31% | 32.8% | 31.09% | 31.6% |
| *Not sure* if it made any difference to my learning | 24.85% | 13.4% | 33.64% | 23.3% |
| *No* - it did not help my learning | 4.23% | 5.6% | 7.14% | 8.6% |
| *No* - it was detrimental to my learning | 0.30% | 1.1% | 0.31% | 1.3% |

To further explore *Lectopia* use, students were asked to select multiple options for the following item, *I used Lectopia in this unit to support my learning in the following ways*. Of the 1002 students who responded to this question, the majority used Lectopia in multiple ways; back up for missing lectures (58.2%), study aid for revision (63.4%), picking up on missed points in lectures (59.7%), revisiting complex concepts (57.5%), taking comprehensive notes (53.5%), and working though material at their own pace (57.0%). These popular responses were consistent with a number of those presented in Gosper et al. (2008; 2010) and Larkin (2010). Furthermore, the ways in which students use Lectopia complements the reasons students come to lectures as shown by the student comments in Table 2. Given that most lecture recordings have some 300 or more hits (Figure 4) and there is a distribution in how often students use Lectopia (Figure 5), it appears that students are selectively accessing particular lectures and lecture recordings. This access is critical and is demonstrated by their responses to the free response question, "*If Lectopia were taken away next semester, how would it affect you?*". Of the 929 free responses, only 15% reported the removal of Lectopia not having an effect or very little effect on their learning. The remaining 85% commented on how they are using Lectopia or intend to use it for their upcoming examinations. Some students went as far to say that they "would die," "would cry," "would be devastated," or "would fail" if Lectopia were removed. A selection of student comments grouped in key themes are shown in Table 2. There were no clear differences in student responses of frequent and non-frequent attendees.

Table 2
*A summary of students' free response comments for the question "If Lectopia were taken away next semester, how would it affect you?"*

| Theme | Student comments |
|---|---|
| Decrease my marks or impair performance | • *Significantly lower my marks as I use it to study more than face to face lectures*<br>• *I wouldn't perform as well seeing as I make a habit of listening to all the lectures again on Lectopia to make and consolidate notes for study for the final exam.* |
| Affect my learning | • *I don't think I would be able to learn as effectively, or comprehensively without being able to listen to lectures for a second time*<br>• *It is a vital learning tool, not just for lectures I miss, but for helpful revision. It should NOT be taken away.* |
| Affect my understanding | • *Would very severely affect me. I find it difficult to concentrate in lectures. Furthermore Lectopia allows me to fill in the gaps in what I have missed. Also the lecturers go through material or talk too fast therefore having Lectopia to fill in the blanks is a very good aspect*<br>• *It would be very difficult to take in all material. It not only helps to ensure you can hear all lectures but it is vitally important in allowing students to revisit concepts and better understand the course.* |
| Affect how I balance other commitments with learning activities | • *Very badly. In coping with a marriage, work and other commitments that were necessary in my lifestyle Lectopia is very much needed to advance my learning at Sydney Uni in the times where it was not possible to make it into campus.*<br>• *Significantly, due to the fact that most of the times I cannot attend lectures due to work commitments. I usually use Lectopia for every single lecture I miss, and tend to listen to them thoroughly. If Lectopia was taken away, I would not have the material to study with, and may fail* |
| I would not be able to cope as well due to language issues | • *It would significantly affect me, as I heavily depended on Lectopia, as my first language is not English and also the lecturer went through materials quickly, so I had to revisit the contents afterwards.*<br>• *As a international student and English is my second language and I don't understand the materials fully at lecture it would affect my scores and achievement in psych* |
| I would not be able to work at my own pace | • *It would be rather annoying not being able to go through the content at my own pace and in detail. I would miss out on important points.*<br>• *Would not be good, as I like the recording and to be able to go back to them or listen in the case that I miss the lecture. At my own pace* |
| I would not be able to make up missed lectures | • *If I do skip a class due to sickness or something, it would be disappointing to have missed an entire lecture and it would be detrimental to my learning. I attend all my lectures, but I have been sick this semester and Lectopia was a good resource for those of us who do wish to learn everything.*<br>• *That would make it harder to catch up on missed lectures, and more difficult to study for exams. It would probably make me do worse in psychology.* |
| Not affected | • *Wouldn't affect me, as I don't use Lectopia*<br>• *No effect, audio recordings were useless anyway without visual recordings.* |

When students were asked, "*have you experienced changes in the way you interact and communicate with your fellow students and teaching staff,*" responses fell into the groups described below. Many students commented on the interplay between lectures and their recordings. This is consistent with findings from Copley (2007), Davis et al. (2009), and Panther, Mosse, and Wright (2011). Some examples include:

- *Lectopia doesn't replace the lecture experience, but is a very useful supplementary tool.*

- *Despite the advantages of Lectopia, I still very much prefer to physically attend my lectures and very rarely will resort to using Lectopia, even if I miss a lecture. I find lecture attendance more effective for learning.*

Some students mentioned the usefulness of the interactivity in lectures as well as socialising.

- *I really like attending the lectures because there are quite a lot of interactive things to participate in. Please add some more in so it's not just we turn up to class and listen to the lecturers read off the slides! Videos and demonstrations are really good!*

- *Able to participate in social activities during the same time as lectures knowing that I can listen to the lectures later*

- *Many students also mentioned that the availability of Lectopia had decreased their interactions with fellow students.*

- *I have met less people and have less interaction with the lecturer so miss the opportunity to ask questions and consolidate my learning and memory*

- *It isolates you from being on campus and getting involved on things going on-campus*

- *On the other hand, some students utilised Lectopia in their interactions with fellow peers.*

- *I ask fellow students questions about the lectures if there was something I didn't understand in the lecture, after I had watched the lecture recording.*

- *My study group goes over particular parts of recordings to revise over the more difficult areas of work that we need to improve our knowledge on. It's definitely helpful.*

Lastly, one student commented on the benefits of having fewer students in lectures.

> *Lecture recordings make people lazy. However they do stop idiots who don't care from attending lectures and talking for the duration of the lecture. I am glad for the lack of distraction.*

- Is there a difference in grades between the frequent and non-frequent lecture attendees?

The grades of frequent and non-frequent attendees were compared, see Figure 6. The frequent attendees received higher grades than non-frequent attendees. Chi-square analysis confirmed the difference in the distributions ($\chi^2$=256, df=5, p<0.001).
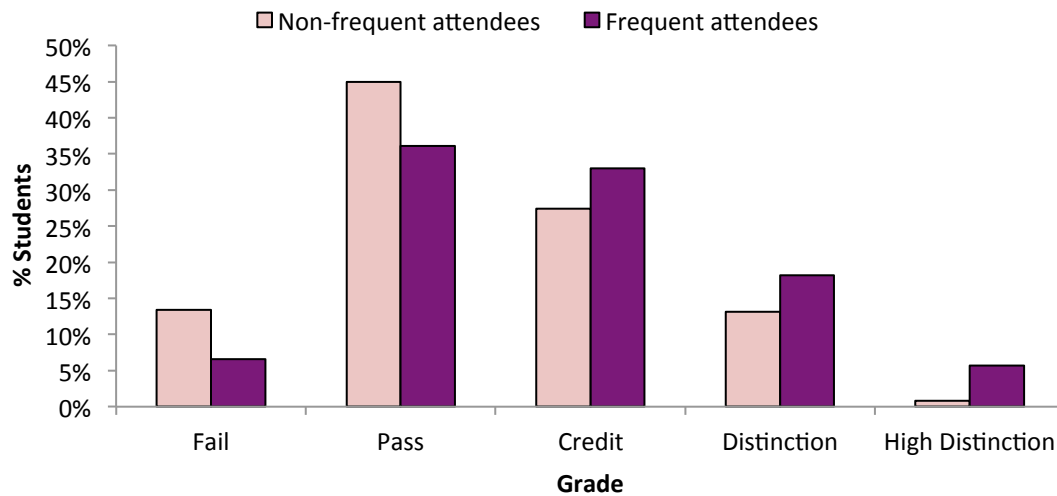
*Figure 6.*　　　　The distribution of student grades for frequent and non-frequent attendees

## Discussion and conclusions

This paper describes an investigation into the interplay between recorded lectures, lecture attendance, learning and performance for a cohort of more than 1000 students in lecture theatres that seat more than 500. Our study compared students who indicated that they frequently attended lectures with those who did not. We find that lecture attendance has not been adversely affected by the introduction of WBLT, student preferences have not swung wildly away from F2F lectures to lecture recordings in that they express both strengths and shortcomings of F2F lectures and are passionate about lecture recordings. Rather, students view the two as complementary, and are strategically using or intending to use lecture recordings. We show this through the responses to our research questions.

- *How often do students report attending lectures?*

Of the 948 respondents, 61% indicated attending lectures almost always and frequently (frequent attendees), while 39% reported attending half or fewer lectures (non-frequent attendees). Over time, many studies have reported around 60% lecture attendance suggesting that in general, students have not abandoned the F2F lecture for lecture recordings (Copley, 2007; Larkin, 2010; Scutter, Stupans, Sawyer, & King, 2010; von Konsky, Ivins, & Gribble, 2009; White, 2009). White (2009) used historical data to confirm that attendance remained at around 75% even after the introduction of recorded lectures.

- *Do the preferences of frequent and non-frequent lecture attendees differ, and why?*

There were some inconsistencies in that some non-frequent attendees answered questions tagged for those who regularly attended lectures, while some frequent attendees answered questions for those who did not regularly attend lectures. However, this provided an unexpected opportunity for comparison.  First, we noted that there is a systematic difference between the frequent and non-frequent attendees, that is, the percentages of the frequent attendees who selected certain reasons for why they preferred F2F lectures were higher than the non-frequent attendees for all except one reason as shown in Figure 2.  Second, the percentages of the non-frequent attendees who selected certain reasons indicating why they did not prefer F2F lectures were higher than the frequent attendees for all except one reason as shown is Figure 3. Third, we take a close look at the reasons which did not follow the trend. Some 380 students said that they attended lectures because they were on campus anyway (Figure 2) while 140 students said that they missed lectures because they could not attend (Figure 3). In short, half the students are making decisions based on other

commitments (Australian Vice Chancellor's Committee, 2012). This is really concerning from a quality of learning perspective and is a worrying trend. In other words, many students are making decisions based on lifestyle choices, rather than the quality of teaching and learning on offer. It raises the question of what can feasibly be done about teaching and learning to "compete" with lifestyle choices.

Third, in terms of translating students' intentions to learn via lecture recordings, some 400 students selected that they would not get around to accessing lecture recordings (Figure 2), an issue investigated by Hood (2013). Some 150 students said that they could learn just as well from recordings as from F2F lectures (Figure 3). Last, around 50% of the non-frequent attendees preferred lectures because they *found live lectures motivating* and *concentrated better in lectures* in comparison to more than 60% for the frequent attendees (Figure 2). These data point to the benefits in terms of providing flexibility is using learning resources, diverse student needs and learning preferences, but also to the need to invest in perfecting both F2F lectures and lecture recordings. What might be the implications, for example on lecturer workload and costs to universities? The lecture recordings in this study were only audio, yet some of the data gathered were critical of this mode. As technology advances, the implication is that students will demand slicker, more professional lectures recordings or resources. So investment cannot be one-off and must be ongoing to keep up to date with technological advances in order for teaching and learning to "compete" with lifestyle choices as raised above. The move to have short lecture clips that encapsulate key ideas (Venema & Lodge, 2013) is a move in this direction. For the lecture, Panther et al. (2011) argued that an audience generates interactivity and engagement, which is valued by students, supporting the notion of lectures as performances (Jones 2007). Visual elements, the ability to interact with the lecture and fellow students are reasons that keep emerging as engaging elements of the lecture (Copley, 2007; Davis et al., 2009; Panther, Mosse, & Wright, 2011).

- *Do students report using Lectopia to make up a missed lecture?*

Further probing students' use of lecture recordings, just fewer than 50% of respondents reported using Lectopia to make up a missed lecture. Reasons indicate that the advances in technology are not fully exploited.

It seems that non-frequent attendees did not use Lectopia as much as first expected. Instead, it was the students who usually attended lectures who were using Lectopia. The finding that the lecture alternatives are more frequently used by those who attend, and possibly need it the least, is startling at first. However, students who use one resource are likely to use more resources from the range available. Those who need to use the additional resources, which are often designed for them, are least likely to use them. In short, these resources are often ignored by those who would be assumed to most benefit from their use. Even though students did not use Lectopia, they valued the availability of the lecture recordings "just in case" they needed it at some point in the semester. These results are similar to that of Scutter et al. (2010) and Larkin (2010). Students value the idea of having a "back up" for unintended missed lectures. This "safety blanket" may possibly contribute to students perceived positive experience of Lectopia and it's value in assisting with their learning. Many students did have the intention of using Lectopia but have not. Students are selectively accessing particular lectures and lecture recordings. These findings are consistent with Bell et al. (2001). Students who did use Lectopia revealed that they not only used the lecture recordings as a back up, but also for revision, consolidating what they had learnt in lectures, or revisiting concepts/points they had missed in lectures. These findings are consistent with previous studies (Gosper et al., 2008; Gosper, McNeil, Phillips, Preston, Woo, & Green, 2010; Gysbers, Johnson, Hancock, & Denyer, 2011; Larkin, 2010). Students also seem to value the ability to work at their own pace, a feature that WBLT offers. So the clear message that has emerged is for educators is to continue providing online lecture recordings. However, given that studies have found that the number of lecture-recording views was not significantly related to test scores (Danielson, Preast, Bender, & Hassall, 2014; Leadbeater, Shuttleworth, Couperthwaite, & Nightingale, 2013) consideration should be given to integrating recordings in a pedagogically

sound way.

- *Do students find Lectopia useful for learning?*

Resoundingly, student responses were passionate that recordings influence their learning and that the lecture recordings are necessary. Students were very vocal when asked how the removal of Lectopia might affect them. Only 15% of students reported that it would not affect them, with the remaining 85% commenting on the way they use or intend to use Lectopia. This is surprising since the actual record of Lectopia hits was not a high as expected.

- *Is there a difference in grades between the frequent and non-frequent lecture attendees?*

Frequent attendees received higher grades than non-frequent attendees. Our results demonstrate that students use lectures recorded lectures strategically (Gosper et al., 2008; Larkin, 2010). They also passionately value the availability of lecture recordings. The potential of lecture recordings will be captured if the recordings are integrated in a pedagogical sound way rather than an "add-on," amongst the "buffet" of learning resources (de Corte, 1996; Salomon & Perkins, 1996). Perhaps a pedagogically-driven implementation of Lectopia could not only contribute to perceived positive experiences, but also to positive student performance outcomes (Larkin, 2010). By listening to students' feedback and giving them a voice, we can improve lectures for the better. These aspects need to be enhanced in practice in lectures and we should not view lectures and lecture recordings as competition, rather as complimentary. We, as educators, need to continually reflect on how we use learning resources, as a mechanism to provide flexibility that assists student learning within blended learning environments provided by our learning management systems.

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