Understanding student absenteeism in undergraduate engineering programmes

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STRUCTURED ABSTRACT

CONTEXT
Correlation between student attendance and eventual performance is well documented in the literature. Even with increasing access to compatible web-based resources or lecture recordings, traditional face-to-face classroom lectures are considered better at engaging the students with the content. Successful students are well aware of the importance of attendance. Yet absences are common in engineering lectures. Often a quarter of the students do not attend lectures. Frequent absences often result in subsequent academic hardship.

PURPOSE
While the relationship between attendance and performance is known, the drivers for the individual absences are either unknown or varied, and thus challenging to address. This study aims to understand the causes for absences in the hope to develop an evidence-based model for strengthening student attendance.

APPROACH
A survey was developed to highlight common reasons for lecture absences and to capture ways students make up for their absences. The survey was administered on students taking core engineering courses at Auckland University of Technology, University of Waikato and University of Queensland. The overall themes from the survey are summarized and discussed.

RESULTS
The survey results agree with anecdotal attendance rates observed by faculty. Many factors influence student absenteeism. The responses reflect the challenge students face in balancing study, family life, and financial commitments. An additional layer of complexity was noted by the availability of recorded lectures.

CONCLUSIONS
Recognizing the various attitudes towards lectures and the varied reasons for lecture absences can yield a powerful mitigation tool. While the results highlight some drivers for absences that are difficult to easily address by a course instructor, the survey does provide insights on areas where instructors may be able to make a notable impact towards student engagement.

KEYWORDS
Attendance, Absenteeism, Lecture Recording, Lecture Videos

Introduction

A meta-analysis by Credé, Roch, and Kieszczynka (2010) presents a strong correlation between student attendance and their eventual academic performance. A number of subsequent studies within engineering fields have also demonstrated the same correlation (e.g., Purcell 2007, Durfee 2012). In short, consecutive absences can easily lead to academic hardship whereby students fail to grasp the threshold concepts. There is a natural concern amongst academics for students who routinely miss lectures and struggle with the content. Anecdotal attendance rates as reported by engineering faculty in our program ranged 70-80%, averaged over the semester. Lecture recordings have become widely available as many universities adopt them as tools to reach students beyond classrooms. Researchers have also demonstrated their utility and impact in numerous settings (e.g., McCraden 2009, Aldamen 2015, Yeung 2016). At the same time, instructors are concerned by their potential impact on attendance (e.g., Kestell 2012, Drouin 2013). It is speculated that if the students are able to view the lectures online, then they would be less likely to attend the face-to-face instruction. This assumption is likely true for passive and disengaging lectures where there is no difference between face-to-face or recorded lectures. However, as instructors, we are well aware of the overwhelming benefits of face-to-face lectures as opposed to online instruction (e.g., Elmore 2012). An interactive lecture that incorporates active learning exercises are challenging to replace with a video recording of the same activity. As Kestell, Willis, Grainger, and Missingham (2012) note with one of the student comments, “The lectures provide an opportunity to ask questions, or listen to the questions other students might ask...” Yet, the absences persist and the students who have missed the lectures inevitably rely on lecture videos to make up for the missed content. The current condition raises several important questions. How are the students impacted when they rely on this inferior replacement for live lectures? At the same time, how is the instruction during lectures impacted by low lecture attendance? Does the insistence of recordings influence faculty to tailor their instruction to be more suitable for online consumption, i.e., less interactive and more passive? More importantly, are there ways to integrate lecture recordings without their detrimental impacts on the classroom learning experience (e.g., Elmore 2013) and likely attendance?

Attendance, as far as the campus experience is concerned, still forms a common thread within such discussions. It is important to understand the reasons behind absences before one can even try to address it. This work stems from the need to identify the factors that influence attendance and how students mitigate its impact on their performance. The existence of recorded lectures has added another layer of complexity to isolate factors. Students at a number of engineering programs were surveyed for this work as a basis for a broader initiative to address the high absences observed.

Methodology

To survey the state of student attendance a four part questionnaire was developed with a particular focus on the limiting the time required to complete the survey and maximizing student participation. The questions simply required students to select from several existing options as responses to the four questions. The survey was also designed to be paper-based and was administered during ‘high attendance events’ such as term assessments, practicals, or tutorials (with one exception at University of Waikato, where the survey was conducted online). Core engineering courses were targeted for conducting the survey at three universities offering engineering programs: Auckland University of Technology (two Mechanical Engineering courses surveyed), University of Waikato (five Mechanical Engineering courses surveyed), and University of Queensland (one Chemical Engineering course surveyed). Table 1 provides a list of questions and prepared responses used within the survey.

Results

A total of 398 students were surveyed during Semester 1 in 2018. The response rate varied based on how the survey was administered. The paper-based survey administered during practicals and immediately following an assessment received approximately 86% responses based on class enrolment. The survey administered during a tutorial, or requested online, garnered a lower response rate of approximately 50%. While the combined results provided useful insights on student attendance during lectures, a further dissection of the results was conducted to highlight the availability of recorded lectures as an overarching influence on attendance. The results were divided into:

(a) **Not Available.** Responses from the courses where lecture recordings were *not* available.
(b) **Available.** Responses from courses that provided access to the lecture recordings.

Table 1 summarizes the results categorized by the availability of the lecture recordings. The proceeding findings contrast and compare the student responses based on such a categorization for each question.

Table 1: A summary of attendance survey questions and responses separated by the availability of recorded lectures compiled from three undergraduate engineering campuses

Lecture Recording	Not Available	Available
N (number of responses) / % response	N = 113 / ~86%	N = 285 / ~50%
Question 1: Rate your attendance for this class		
I rarely attend lectures	4%	13%
I occasionally attend lectures	9%	6%
I have attended about half of the lectures	19%	14%
I have attended most of the lectures	38%	25%
I have attended almost all the lectures	30%	42%
Question 2: Select one or more reasons for your absences stated above.		
Other academic commitments	19%	17%
Work/employment	14%	10%
Personal/Family commitments	10%	7%
Transport challenges	18%	7%
Health	11%	8%
Lecture quality	7%	20%
Availability of recorded lecture material	5%	16%
Other	16%	16%
Question 3: Select one or more ways how you made up for the missed lecture(s).		
Watched an online lecture/video.	19%	42%
Reviewed relevant material online.	32%	19%
Read textbook.	16%	12%
Sought help from peers (with notes or discussion).	24%	15%
Sought help from tutor.	4%	5%
Did not do anything.	5%	6%
Question 4: Rate how difficult it was to make up for the missed lecture(s).		
Very Easy	5%	31%
Somewhat Easy	16%	28%
Neutral	41%	25%
Somewhat Difficult	32%	11%
Very Difficult	6%	5%

Question 1: Lecture Attendance

About a third of the students reported being absent for half or more of the lectures during the semester. These findings match anecdotal evidence from faculty who were consulted prior to designing the survey. Students who had access to video recordings of the lectures reported much higher instances of “I rarely attend lectures” compared to the students who did not have access to

video recordings. These results are consistent with the hypothesis that the availability of lecture videos may discourage attendance.

Conversely, the students with access to lecture recordings were notably more likely to state “I have attended almost all lectures.” This contradictory outcome may be explained by the location of the campus. The program with no access to lecture recordings is located in the city with majority of its students commuting to campus for lectures. As a result, even the students who are likely to attend all the lectures struggle to maintain a perfect attendance record due to transport challenges. This assumption is confirmed by the responses to the next question.

Question 2: Reasons for Absence

Overall, a significant number of students stated “other academic commitments” as a reason for their absence for both the categories of the responses. Such a response is expected considering the typical academic load for engineering programs and the known lack of time management skills amongst undergraduate students. With that being said, setting academic load expectations early during the term can greatly mitigate this as a reason. The second most common reason for absences was broadly grouped as “others.” Here students provided a short description of their reasons for not attending. The most popular responses were associated with lecture timing (e.g., “Timing of Lecture” and “Too early in morning”) and the students’ need to catch up on sleep (e.g., “Workload from other papers resulting in all nighters + sleepins” and “Too early in the morning”). While these two responses are related, pointing to the need for better time management, there were several students who reported the timing of two lectures was too far apart to warrant a stay on campus for the whole day (e.g. “Large gaps between classes (4 hrs)”). Here the solution can be as simple as scheduling lectures closer together to improve attendance.

Categorical analysis of responses reveals a different perspective. For the students who did not have access to video recordings of the lectures, transport challenges and work commitments represented the next likely reasons for their absence. Again, the city location of the campus for these students is the distinguishing variable: most students commute to the campus that does not offer lecture recordings. For the city campus students, the reasons to the absences align well with their campus location. In contrast, the students who had access to lecture recordings overwhelmingly reported lecture quality and the availability of video recordings as the primary reason for their absences. The finding here supports the major concerns with the availability of lecture recordings.

Question 3: Making Up for Missed Lectures

Over half of the students used lecture videos or supplemental online material to make up for the missed lectures. Naturally, the students who had access to recorded lectures preferred to use them over other online material when compared to the students who did not have access to recorded lectures. The use of online resources is in stark contrast to the number of students who used the required textbook as their primary resource to review missed lectures. An interesting difference appears in the responses related to the students’ use of their peers to make up for the missed lectures. The students who had access to lecture recordings were less likely to seek assistance from their peers compared to the students who could not review the lectures via video recordings. This observation suggests that the availability of the lecture videos likely removes the need for the absent students to consult their peers for notes or explanations. Similarly, “consulting tutors” tied with “not doing anything” as the least favoured approaches after missed classes for both groups of students.

Question 4: The Challenge of an Absence

A notable difference in student perception towards the effort of making up for missed lectures was observed. As expected, without recorded lectures, students found it difficult to make up for the missed classes. As opposed to students who had access to recorded lectures who could readily view the lectures at a later date and catch up on the missed material. Without video recordings, students had to explore various alternatives to make up for the missed content, which likely included seeking help from their peers and reading the textbook. Therefore, the lack of recorded lectures may encourage resourcefulness and self-reliant learning as opposed to recorded videos, which are easy to disengage from.

Discussion

It is challenging to have a meaningful discussion of student attendance and its impact without deconvolving the compounding effects of teacher effectiveness, subject being taught, classroom management, student backgrounds, students' grasp of the content, etc. Besides, simply attending a lecture does not mean students are engaged with the content. Nevertheless, the consequences of making lecture recordings available for review can be broadly described as:

a. They provide an opportunity for students who were absent to catch up.
b. They allow students who already attended to reinforce their understanding.
c. They provide a reason not to attend in the first place and just watch the lecture video.

The top two likely describe self-motivated students. Whereas the last, has the potential to negatively spiral into academic hardship. Especially considering the less motivated students are likely to also struggle with time management and may procrastinate until the next assessment. Given, this is only speculation with the current data set, it aligns well with correlations between attendance and academic performance presented earlier. One can further argue that passively watching a video of a lecture that is deliberately designed to deliver content to a live audience (often embedded with active learning exercises) is not the same as being present in that learning space. Simultaneously, high absence rates impact the in-class experience and further exacerbate the quality of instruction in class. The results also suggest video recordings may decrease peer interactions, which are crucial for deeper engagement with the content. Therefore, video recordings should be treated as supplements and not replacements for lectures for a blended learning approach.

When asked, students prefer lecture recordings as a resource. So, how can we provide this new resource without its negative influence on attendance? Expiry dates on lecture videos (e.g., Elmore 2013), frequent assessments (e.g., Kestell 2012), and instituting attendance policies (e.g., Lowder 2015) can help to some extent. However, there is a need for a more fundamental and strategic approach to address this issue. To begin with, how do we differentiate the campus experience from a purely online learning? Already, the results presented here suggest students who have access to recorded lectures seem to think the quality of lectures is a strong factor for missing lectures. Whether this perception is a result of actual poor teaching quality, the reliance on lecture videos that are inherently less engaging, or the compound effect of both, is difficult to surmise from the current data. With the prevalence of recorded media, it is strongly recommended that instructors differentiate the in-class experience from the experience of watching a lecture video. Active-learning components have a proven track record of engaging the audience with the content and typically do not translate well to video recordings. By incorporating such high-engagement components to live lectures, instructors can easily boost the value of attending in person over passively absorbing the content. Besides, a passive lecture experience can be and should be replaced by videos.

Conclusion

With attendance seen as the first step towards engaging students, it is natural that absences have come into focus with wide adoption of lecture recordings. The survey results support this observation with over a third of the students surveyed reporting missing more than half of the lectures during the term, and that the absences were notably worse when video lectures were available. Students pointing to 'other academic commitments' as one of the top reasons for absences, seems to suggest the need to set clear expectations of academic load within engineering programs. Commuting challenges and employment also constituted reasons for absences, along with lecture timing and poor time management by the students. Notably, the availability of recorded lectures demonstrated an influence over absences, the perception of lecture quality, and peer interactions. While these results highlight few drivers for absences that are difficult to address, the survey results do indicate areas where strategic changes can yield overall positive outcomes as far as student engagement is concerned.

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