

## Attention! Student Voice: Providing Students with Digital Learning Materials before Scheduled Lectures Improves Learning Experience

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### ABSTRACT

This article presents the outcome of research into student experience in accessing digital lecture content before scheduled lectures. The present study explored the extent to which providing students with lecture materials before scheduled lectures influence class attendance. A survey was designed and administered to self-selected students (n=75), enrolled in a first-year Health Science course at a research-intensive University in New Zealand. Students mostly reported that access to digital lecture materials before scheduled lecture contributed immensely to learning. In particular, benefits reported included: better preparation for scheduled lectures, better note-taking during lectures, active engagement with content and the lecturer. Further, the study found that providing students with lecture materials before scheduled lectures did not directly influence attendance. This research contributes to the growing significance of the student's voice in shaping the design and optimisation of learning environments in higher education. It appeals to a need for continuous pedagogical transformation by dynamic and diverse student learning needs.

### INTRODUCTION AND LITERATURE

Institutions of higher education are experiencing significant growth in student enrolment, marked by increasing diversity in preferences to access learning materials and teaching (Cathorall et al., 2018; Lubicz-Nawrocka, & Bunting, 2019). Students different preferences to accessing learning, together with the rapid increase in the numbers of students enrolling into higher education institutions means that educators are likely to face the daunting challenge of teaching larger classes while maintaining the quality of learning that caters for diversity (Lawrence, 2019). In the last decade, there has been an increasing attempt to utilise various forms of digital technologies to deliver instructional materials to a large number of students, whether in a blended or entirely online course. Rismark et al. (2007) pointed out that the use of digital technologies represent new opportunities for students to gain prior knowledge ahead of lectures.

Discourses about student access to digital materials and disruption in lecture attendance patterns are not uncommon in the higher education literature. For over a decade now, the digitisation of the teaching and learning landscape within the higher education environment has challenged the traditional teaching practices (Chaplin, 2009; Hiltz, & Turoff, 2005). Students are increasingly using digital technologies to support their learning.

Recent work suggests that most students in higher education are comfortable engaging with digital technologies and use other forms of technologies such as social media for connecting and interacting with friends (Gallardo-Echenique, Bullen, & Marqués-Molias, 2016). Contemporary pedagogical practices in higher education promote student-centred approaches, involving active engagement in the classroom and a higher degree of digitalisation of learning materials. With the increasing number of diverse undergraduate students entering higher education, implementing active participation in massive courses is difficult, primarily because restructuring lectures are time-consuming, administratively challenging and lecture are more likely to resist especially, in the absence of adequate support or reward for new initiatives (Allen & Tanner, 2005; Romer, 1993).

To optimise the learning environment to engage students better requires teachers to listen to student's voice as a way to transform pedagogy (Kane & Maw, 2005) and implement digital strategies to encourage various ways of accessing content. On the other hand, integrating the student voice to the redesign of the teaching environment is critical to enhancing student learning experience (Prensky, 2005). Student's voice is an ongoing dialogue between students and teachers on shaping the

design of the learning environment (Mitra, 2008; Nelson, 2015). It challenges the traditional approach that tends to intentionally exclude a student from the design of their learning experience (Conole, 2008; Fielding, 2004; Nelson, 2015; Osberg, Pope & Galloway, 2006).

On our campus in one of the first year Health Science courses, students have been vocal and repeatedly requested access to the content of digital lecture materials before scheduled lectures. Some lecturers were concerned that providing students with learning materials before lectures would interfere with attendance. The present study was designed to respond to this issue. It was an opportunity to explore the role of students as active partners in the decision-shaping the design of learning environment (Fletcher, 2014), and also catering for students as digital natives implementing new and developing digital technologies along with teaching strategies that resonate and support students (Kincey et al. 2019). While approaching this, we similarly took into account concerns expressed by educators, that provision of lecture materials before scheduled lectures can influence student attendance, because it was well supported by research suggesting (Sheely, 2006; Walvoord & Johnson, 1998).

However, after a review of the literature, we found the body of research that contradicts the view that providing students with the digital content of lecture materials could lead to fewer students attending classes (Walvoord & Johnson, 1998). The literature suggests that students often make deliberate attendance decisions (Billings-Gagliardi, & Mazor 2007). Decisions to attend lecture are by large influenced by the quality of teaching, conflicting assignment deadlines on other classes, the lecturer's ability to engage students, lack of interest in class and illness (Clay & Breslow, 2006).

Further, the transition to teaching in technology-enhanced learning environments usually emphasise active engagement and utilisation of a variety of teaching strategies (Devadoss & Foltz, 1996). For examples, active methods of teaching such as flipped classroom require educators to provide students with the content of lectures before scheduled lectures (Bergmann & Sams, 2012; St Clair, 1999). Brown and Manogue (2001) further showed that in the Sciences providing students with lecture materials before lectures are critical to their learning, an observation echoed by the view that students prefer that university teachers offer lecture notes and slides online before scheduled lectures (Defour, M. 2013). The availability of online lecture materials allows students to compensate for absences by providing them with access to class information they would not otherwise access and that it enriches their learning and performance (Fulton, 2012). More recently, the provision of digital materials to students within the flipped classroom has shown that students benefit much more when learning designs are planned and effectively aligned and that the design itself influences the level of student satisfaction and the extent of engagement in in-class activities (Awidi & Paynter, 2019).

Drawing from the literature, we developed a research-led teaching framework (figure 1) to guide us through the process of further exploring student voice in our research. The framework was based on the assumptions that excellence in enhancing the quality of student learning experience is driven by researching student expectations (Brew, 2002; Russell, Malfroy, Gosper & McKenzie, 2014; Sander, Stevenson, King & Coates, 2000; Zamorski, 2002). The aim of the current research was to explore whether there was adequate evidence to suggest that providing students with digital materials before schedule lectures would lead to a drop in class attendance. We saw this as an opportunity to tune to student's voice as a vehicle to enhance student learning with technology within the higher education sector and at the same time acknowledged educators well-founded concerns. The research pathway that guided us in the research is presented in figure 1. Figure 1 was developed in congruence with the understanding of research-led teaching, a research activity that emphasises the use of the teacher's disciplinary research to benefit student learning and outcomes (Trowler, 2010; Trowler & Wareham, 2008).

Overall, our research is aimed at improving teaching and student learning, because we believe that teaching-led research can provide detailed information about how digital technologies affect students as they learn, which in turn can help faculty who seek to improve the quality of teaching. Most of the research-led teaching problems we explore are either based on observation, student or teacher's concerns. Attending to the student's voice through research, in particular, can enhance student learning (Lehmann, et al., 2000) since students must relate new information to their experience to better understand the learning materials (Lustbader, 1998).

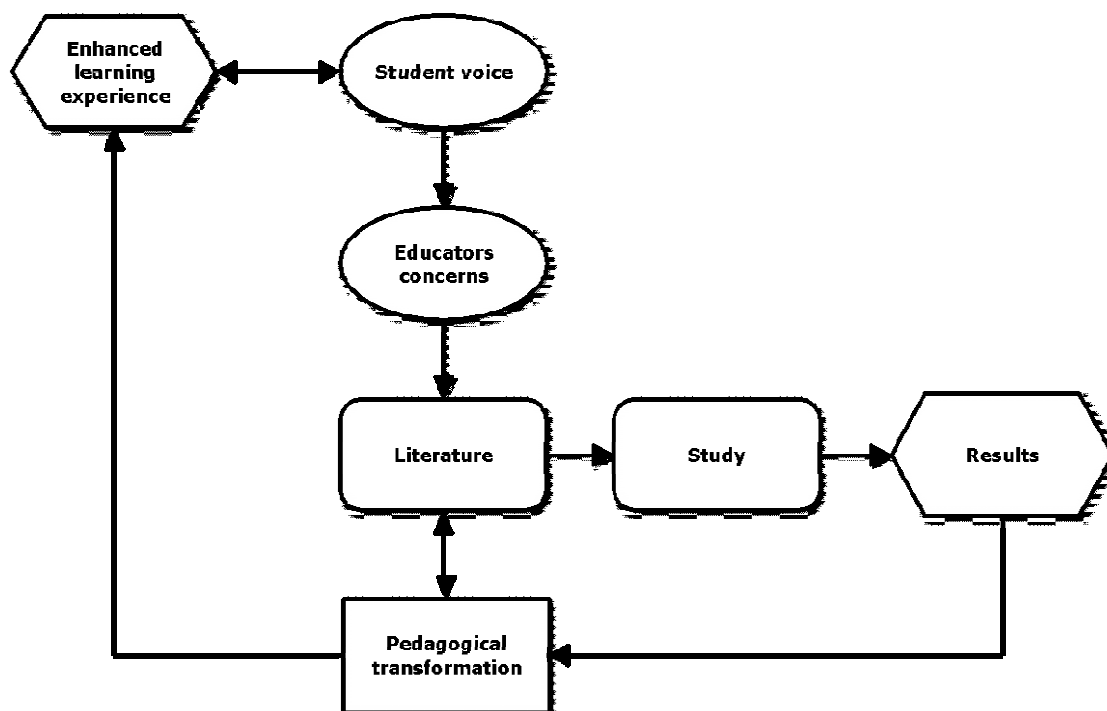


Figure 1. A research-led teaching pathway for addressing the student's voice

#### METHODS AND PROCEDURES

We surveyed a large first-year Health Science course, broadly looking at access to digital content of lecture materials, class attendance patterns and student engagement with content, peers, and the lecturer. The main questions that concerned us were whether or not the provision of lecture materials enhanced learning. How students were engaging with the content of digital lecture materials and how that has enhanced their learning experience in the course. The research focused on student self-reported perceptions rather than observations and analysis of learning outcomes (e.g. performance in exams).

We utilised a survey design to explore these questions and to gain a good overview of the topic. Respondents were students enrolled in a large Introductory Health Science course at research at intensive-teaching University in New Zealand. Data were collected using a questionnaire with 19 assessment items with some statements measured on a Likert scale (1= strongly agree; 2= agree; 3 = disagree, and 4 = strongly disagree). Since there was no scale to measure student engagement with the content of digital lecture materials before the delivery of lectures, the first stage of the project was to develop to develop the questionnaire based on the outcome of the literature review and more extensive consultations with the lecturers of the course. Lecture materials (PowerPoint slides, podcast, and reading materials) for the final module (9 lectures) of the semester were posted on learning management system (Blackboard) at noon the day before their scheduled lecture for students to access before scheduled lectures. The questionnaire was then piloted with ten respondents, revised and administered online using self-selected convenient sampling (n = 75; a response rate of 8.5%).

#### Analysis and Participants

Statistical Package for the Social Sciences (SPSS) version 24 was used to analyse data. Descriptive was used to summarise results. We tested the instrument for reliability, and it revealed an overall Cronbach's Alpha showed ( $\alpha = 0.79$ ). Four items on the contribution of enhanced learning after accessing the content of digital lectures and yielded ( $\alpha = 0.877$ ) (table 2), reliability score of another subscale with measuring various ways of engagement with the learning content of digital learning revealed ( $\alpha = 0.822$ ) (table 4). Demographic characteristics (see Table 1) were analyzed, and suggesting that the majority of the respondents (71, 95%) were young with age range (18-24) and self-identified as females (46, 61%) with males comprising (29, 39%). Further, most of the respondents identified were in their first year of university (71, 95%).

**Table 1. Respondent characteristics**

Characteristics	(n, %)
<b>Age</b>	
18-24	(71, 95)
25-34	(2, 3)
45-55	(1, 1.3)
55+	(1, 1.3)
<b>Sex</b>	
Female	(46, 61)
Male	(29, 39)
Other	(0.0,0.0)
<b>Year in the program</b>	
First year	(71, 95)
Second year	(3, 4)
Third year	(1, 1)

## RESULT

We survey asked participants whether providing them with lecture materials before scheduled lectures improved their learning experience (see Table 2). The majority (64, 86%;  $M = 1.51$ ,  $SD \pm 0.99$ ) mentioned that their learning experienced was enhanced after accessing the content of the digital lecture materials before class but (11, 14%) indicated this was not the case. Students also reported that access to digital learning materials helped them better prepare for lectures ( $M = 1.41$ ,  $SD \pm 1.0$ ), contributed to retained knowledge ( $M = 1.51$   $SD \pm 0.95$ ); improved notes taking ( $M = 1.5$ ,  $SD \pm 0.92$ ) and made revisions easier ( $M 1.48$ ,  $SD \pm 1.0$ ).

**Table 2. The contribution of digital resources to learning**

Access to digital learning materials:	Mean	Std. Deviation
Help enhance the overall learning experience	1.51	0.991
Makes revisions easier	1.48	1.005
Improves notes taking during lectures	1.55	0.92
Helps in retaining knowledge	1.51	0.95
Helps in preparing for lectures	1.41	1.041

**Cronbach's Alpha revealed ( $\alpha = .89$ ) for 5 items.**

**1=strongly agree 2= agree 3= disagree 4= strongly disagree**

We also asked respondents how they engaged with the digital lecture materials before the lectures. The majority of participants said they used lecture materials to annotate useful content during lectures (29, 39%), and after lectures (10, 13%), while others indicated they used lecture materials to familiarize themselves with the content of the lecture (27, 36%).

**Table 3. Provision of learning materials before scheduled lectures and engagement**

Provision of pre-lecture materials	SA(n, %)	A(n, %)	D((n, %)	SD(n, %)
Enriched learning experience	(44, 59%)	(20, 27%)	(4, 5.3%)	(7, 9.3%)
Help improved engagement in class	(26, 35%)	(26, 25.3%)	(14, 19%)	(8, 11%)

Help improved engagement with course	(47, 63%)	(17, 23%)	(5, 7%)	(6, 8%)
Help improved engagement with the lecturer	(42, 56%)	(19, 5.3%)	(7, 9.3%)	(7, 9.3%)

SA=Strongly Agree; A=Agree; D=Disagree; SD=Strongly disagree

**Table 4. How provisions of digital learning resources contribute to engagement**

	Mean	Std. Deviation
Improved engagement in class	1.19	1.074
Improve engagement with course materials	1.56	0.933
Improve engagement with the lecturer	1.49	0.978

**Cronbach's Alpha revealed ( $\alpha = .821$ ) for 3 items.**

**1=strongly agree 2= agree 3= disagree 4= strongly disagree**

Results suggest that the ability to engage with the content of digital lecture materials contributed to the enhancement of learning (see Table 4). For example, access to learning materials before lectures improved engagement in the class ( $M = 1.19$ ;  $SD \pm 1.0$ ); improved engagement with the lecturer of the course ( $M = 1.49$ ,  $SD \pm 0.97$ ), and content of the course material in general ( $M = 1.56$ ,  $SD \pm 0.93$ ). Even though lecture materials were provided before lectures, we were aware that students were more likely to access materials at different times.

The majority of students (64, 85%) accessed lecture materials posted on the learning management system before scheduled lecture; a small number, (3, 4%) accessed after the lecture and (8, 11%) reported that they did not access learning materials at all. Based on the time of access, we were interested in determining whether there was an association between those who access lecture materials before the lectures and those who did not, and whether or not participants reported enhanced the learning experience. We found a significantly positive correlation between participants who reported overall improved learning and accessing lecture materials before scheduled lectures  $r(75) = 0.93, p = 0.01$ .

Furthermore, there was a strongly significant correlation between overall engagement with learning materials, and overall sense of enhanced learning experience was observed  $r(75) = 0.82, p \leq 0.05 = 0.001$ , suggesting the more engagement student have with pre-lecture materials, the more they feel a sense increased learning experience. Moreover, overall learning experience and its relationship to various forms of engagement were extremely significant (see Table 5).

**Table 5. The relationship between enhanced learning and engagement**

	a	b	c	d	e	f
a) Overall learning experience	—					
b) Improved engagement in class	.585*	—				
c) Improve engagement with course materials	.778*	.466*	—			
d) Improve engagement with lecturer	.814*	.504*	.854*	—		
e) Retain knowledge	.799*	.532*	.707*	.670*	—	
f) Improve notes taking during lectures	.508*	.462*	.666*	.544*	.586*	—

**\*\* All correlation is extremely significant at the 0.01 level (2-tailed).**

Furthermore, there was a significant differences in the way male and female perceive the importance of accessing digital learning materials before lectures, and the extent to which this contribute to enhancing learning ( $X^2 = 10.72, df = 3, N = 75, p \leq 0.05 = 0.013^{**}$ ); how the digital learning materials contributed to their improved engagement in class ( $X^2 = 9.8, df = 4, N = 75, p \leq 0.05 = 0.04^{**}$ ); ( $X^2 = 9.8, df = 3, N = 75, p \leq 0.05 = 0.04^{**}$ ); improved engagement with course materials ( $X^2 = 12.8, df = 3, N = 75, p \leq 0.05 = 0.001^{**}$ ); improved engagement with the lecturer ( $X^2 = 8.5, df = 3, N = 75, p = 0.03^{*}$ ). Additional, results showed very significant gender differences in agreement on whether or not to attend lectures after receiving digital lecture materials with females 32(43%) more likely to attend lectures than male 20(27%) ( $X^2 = 9.6, df = 3, N = 75, p \leq 0.05 = 0.02^{*}$ ).

### **Lecture Preparation**

A significant number of respondents mentioned that accessing lecture materials before lectures enhanced their learning (65, 87%). They felt it made preparation for lectures more accessible, more interactive and meaningful. It also made them reflect more on the lectures before lectures. More specifically, it helped them to identify weak areas that needed their attention during the lecture (60, 80%). Participants also mentioned that having access to the materials before lectures made them more likely to recall and retain content during lectures (72, 83%). It also improved their ability to take notes (61, 81%).

### **Lecture Attendance**

Contrary to the views that are providing lecture materials to students before lectures are likely to deter students from attending lectures, our findings indicated that the release of the lecture materials before lecture encouraged students to attend lectures (52,69%), and only (23, 31%) reported that they would not attend lectures. Findings revealed that the most frequent reason given by these students for regularly attending lectures was the likely benefit to their learning.

### **Engagement in Lecture Materials**

About (64, 86%) of participants mentioned that accessing lecture materials before lecture improved their engagement with lecture materials. We also asked participants when they would normally access resources, the majority (64, 85%) indicated they accessed lecture materials before lectures, (3, 4%) mentioned accessing learning materials after lectures (8, 11%) stated they did not access lecture materials at all.

### **Engagement with the Lecturer**

We asked participants whether the provision of lecture materials influenced their engagement with the lecturer during lectures. Respondents indicated that the lecture materials helped improved their interaction with the lecturer (61, 81%). These findings revealed that having prior access to lecture materials helped students identify areas they needed help with, and as such, they were able to have meaningful engagement during lectures. They also indicated that having materials before lectures meant they would have time to listen to the lecture and actively take notes to clarify difficult concepts.

Furthermore, we explored whether providing students with prior access to lecture materials is likely to engage them with peers in the classroom. It seems more than half of participants (62, 70%) indicated their engagement with peers was improved after accessing lecture materials before lectures.

### **LIMITATION**

Results of this research must be interpreted in light of some potential limitations. Ideally, a randomized experiment could have been employed to study the effect of providing lecture materials to students before lectures and students' learning outcomes. Further, the generalisability of this study is limited because it was conducted at a single institution with a low response rate of 8.5%. We are also aware that any pedagogical transformation puts a significant workload on lecturers, most of who are already overworked, we have not explored lecturers' views about the efficacy of this change and its implication in practice.

Since the present study was based on survey data alone, it does not provide in-depth insights into factors that are likely to effectively engage students with digital learning resources to provide to them before scheduled lectures. More recently, alternative methods to understand students' engagement with digital learning materials were proposed. For instance, O'Brien and Verma(2019) observed that much of the current knowledge of how students engage with technologies and the effect on traditional lecture attendance is mainly derived from student surveys rather than comprehensive independent analyses.

Further, the conclusions drawn in the study might not tell much about student learning outcomes. It should also be noted that the cohort in the study was predominately the first year and might not be experienced, learners. This study was a first attempt to provide an overall view of how students engage with digital learning resources and set the stage for further experiments currently underway.

### **SUMMARY AND CONCLUSION**

The requirements of the 21st-century classroom in higher education are rapidly changing with increasing student demands and continuous implementation of technology requiring innovation in pedagogy, and are resulting in improved student outcomes. The lecture form of teaching in the classroom has been a dominant practice in higher education for many years, though its prevalence has been criticised (Sams & Bergmann, 2013; Traphagan, Kucsera & Kishi, 2010), yet this criticism

has not to lead to significant changes in teaching practices (Grant, 2013 ). As student learning needs become diverse, a growing number of institutions of higher education are now seeking ways to transform the conventional mode of lecture form of teaching to adapt to changes in students learning needs. Some are utilizing online learning technologies to support student learning (Gosper, Malfroy & McKenzie, 2013; Mattick, Crocker & Bligh, 2007). It is expected that utilizing these technologies would personalize student learning experience, and providing students with some level of autonomy in their learning (Walvoord & Johnson, 1998). Student engagement with content, learning, and lecturer enriches learning experience (Anderson, 2003).

In this digital learning landscape, students have become vocal and increasingly demanding that educators include them in the planning and design of their learning environments (Daniel & Bird, 2016). They demand the provision of flexible learning environment that enables them to timely access to various forms of digital educational resources, including lecture notes, and online support. However, there is a myth among some educators that provision of digital learning materials to students in advance of lectures would lead to absenteeism and subsequently poor academic performance.

This article explored whether providing students with lecture materials before lectures improve their engagement with learning. The paper also probes whether such provision reduces class attendance, by asking the students if they were less likely to attend class due to the intervention. The analysis of the questionnaire data does suggest that the students perceive lecture notes to be valuable to their learning and that over a third indicated that they would not attend lectures. Findings in the present study are similar to the literature suggesting that making lecture materials available to students before lectures can increase class participation (Babb, Kimberley & Ross, Craig, 2009; Chen & Lin, 2008; Grabe & Christopherson 2008), and that providing students with pre-lecture materials is likely to led to higher grades, and that pre-lecture preparation is more responsive to learners' needs; moreover, it creates additional incentives to study (Romanov et al. 2019). Further, a more recent study has revealed that the availability of digital learning resources support student's learning and decreases the time needed to engage in notetaking. Provisions of these materials serve as a safety net mechanism for missed notes and the occasionally missed lecture (Wood et al. 2018).

Participants in this study told us they use the content of digital lecture materials to familiarize themselves with the lecture ahead of the class, and claimed it facilitated active engagement during lectures. These findings are consistent with recent findings that in larger classes, providing digital materials together with the utilisation of various forms of digital technologies such as smart classrooms, learning management systems, and better timetabling is likely to achieve the quality of learning achieved in a much smaller enrolment class (Godlewska et al. 2019).

Respondents also mentioned that access to the digital content of lectures before class helped them take better notes during lectures. Though this particular outcome is supported by the literature (Chen & Lin, 2008; Cohn, Cohn & Bradley, 1995), we did not observe student behaviours in the classroom and the kinds of learning activities. However, overall our research has led to some significant pedagogical changes. The lecturers involved in teaching the course are currently making lecture materials available to students before scheduled lectures and exploring active learning strategies in their classes.

#### **Statements on open data, ethics, and conflicts of interest:**

- a. Data used in the study can be requested from the authors of the article, subject to the ethical guidelines of the institution in which the study was conducted.
- b. The study reported in this article has ethical approval from the institution in which the study was carried out. All results were presented in an aggregated and anonymised form. Survey participants were informed about how data will be used and were ensured that the study would identify individuals.
- c. The authors of this article declare no conflict of interest in the research reported. The first author of the article was not involved in the teaching of the class. The second author was involved in teaching one of the modules in the course but did not participate in the data collection.
- d. Some of the data in this paper were presented in a conference paper EdMedia 2016.

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