Use of Lecture Capture in the Teaching and Learning of Statistics

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Abstract: *Lecture capture is a recent development in higher education, many higher education institutions use it to supplement and replace missed lectures. This is a preliminary study to find out the status of lecture capture implementation in Malaysia for the teaching and learning of Statistics. Statistics is a subject that needs multiple approaches in its teaching and learning because of its nature; it needs referencing to statistical table and implementation of statistical tests (using software). Lecture capture is effective in delivering these to the students. In this study the general perceptions on using lecture capture are identified and these will provide some helpful information or guidelines pertaining to the use of lecture capture in teaching Statistics.*

1. Introduction

Lecture capture is the recording of lecture in some formats that can be available to students' use at a later stage. Lecture capture comes in many forms and formats, for this article lecture capture refers to recording of lecture either in video or audio and they can be used online or offline; these include podcast, narrated PowerPoint, web lecture and personal capture and some others. Recently there is an increase in the use of lecture captures in institutions of higher learning, especially where the enrolment is large because of easy availability and accessibility of sophisticated technology and the increase in demand from students [5, 7, 12, 15]. Research also shows that many students prefer courses accompanied by online recordings and an increase number of universities provide recorded lectures [8]. Instituitions of higher learning in Malaysia aware of this and have taken positive steps to encourage lecturers and students to fully leverage on this technology. Some instituitions provide incentives to their teaching staff for the development of e-contents. Although there are limitations and constraints; the development of lecture capture among academic staff is an ongoing process. This study serves as a priliminary on this effort and it intends to identify the best practices under limited budget and limit resources conditions.

2. Literature Review

There is no one-fit for all formula in education technology. There are pros and cons on the use of technology in education; similarly there is no exception on lecture capture. It has its advantages and disadvantages and it all depends on how and when we use it and to whom we use it for. In order to optimize its use, we need to understand some of the theories. The commonly cited theory in using lecture capture is the Cognitive Theory of Multimedia Learning [11]. This theory states that information presented in audio and visual modalities simultaneosly will result in optimum learning and it can improve the process of transfer of learning and hence there is a better retention mainly because it will reduce students' cognitive load and increse students' working memory. Besides that Media Richness Theory or Information Richness Theory also provides good theoretical framework for the understanding on the use of lecture capture [4]. It is a framework to explain why certain medium is better than the others. For example a phone call is less effective than a video conferencing because it cannot reproduce gestures, so it is a less rich communication media. Thus Bassili found that students would attend live lectures when they expected the learning content to be difficult, but would watch recordings when they perceived the content to be less difficult [1].

Lecture capture offers many advantages; it appears to increase students' performance, retention and satisfaction [16]; it helps students understanding complex information by referring to it at a later stage because it has the ability to reply and rewind on those difficult concepts [2]. Harpp, et al. found that students seem less stressful and anxious when they can take detailed notes of attended lectures later on at their own pace without worry of missing information and they can catch up on missed lectures [10]. Copley opined that lecture capture offers students greater flexibility and they can learn at their desired speed, setting, and with the most suitable tools [3] and on the other hand results also indicated that students using podcast together with notes taking scored significantly higher than traditional lecture condition [13].

Lecture capture in mathematics education also shows positive results. In a study by Zimmermann, Jokiaho and May found that there is a decrease in the failure rates for courses where lectures are recorded [17]. On the other hand some results are mixed; Miller found that in a Calculus class grades and instructors' satisfaction level remained the same [14], whereas students' satisfaction level improved significantly. Lecture capture is good for teaching Statistics because it can deliver audio and visual impacts to students as good match of these can give better retention in learning [11]. Besides that it can also provide media-rich contents for teaching Statistics; statistical table and software demonstration can be easily embedded in the lecture by using screen-casting [4].

Many believe that by having lecture capture many students will not attend normal lecture. The literature provides mixed results on the influence of lecture capture on student attendance. Some research suggests that lecture capture has minimal impact on attendance of in-class lectures [5]. However, other studies indicate that the provision of recorded lectures negatively impacts students' attendance of in-class lectures [9]. In any adoption of technology into teaching and learning, there are bounds to have positive and negative impacts. A good implementation will take these into consideration and is able to avoid all the pitfalls during the adoption.

3. Research Question

This study intends to answer the following research questions:

- Do students have adequate computer facilities for using lecture capture?

- What are their online habits?
- What is the status on students' awareness on OERs and lecture captures?
- What are the students' perceptions on lecture capture?
- How to sequence lecture capture for teaching and learning?

4. Methodology

A random sample of 67 students who attend Quantitative Techniques II in a local private university was selected for this study. The study is divided into three stages: Stage I involves education on lecture capture which includes a brief introduction on lecture capture; Stage II is on students' use of lecture captures. Two lecture captures are given to students and they are advised to use them as supplements for normal lectures. The final stage is a questionnaire survey on the perceptions of students' use of lecture capture. The selected topic is a Normal Distribution. Screen captures on how to use Standard Normal table and solving application problem on Normal Distribution are given to the students. Results are analyzed using SPSS.

5. Results and Discussion

A total of 67 students took part in this study; 15 of them were males and the rest were females. All students owned their computers and with full Internet connections. Their online frequency was considered high; 96% of them online every day. Table 1 depicts their online frequency. Their online activities are engage in social media, watch video from YouTube, retrieve e-mail and play online games. Logon to social media like Facebook was considered the most important online activity (80.0%), followed by watching YouTube (9%), retrieving e-mail (9%) and playing online games (2%). Table 2 describes their important online activities.

Table 1: Online frequency

	Frequency	Percent	Valid Percent	Cumulative Percent
Everyday	64	95.5	95.5	95.5
Once a week	1	1.5	1.5	97
Once a while	2	3.0	3.0	100.0
Total	67	100.0	100.0	

Table 2: Percentage of respondents on online activity

Activity	% Respondents
Social media like Facebook	80.0
Watch YouTube for leisure	6.0
Watch YouTube for educational purposes	3.0
Retrieve e-mail	9.0
Others (play games)	2.0
Total	100.0

Open Educational Resources (OERs) are considered to be an important development in education recently. Many institutions encourage their staffs to contribute to and use OERs for mutual benefits. The Ministry of Education, Malaysia had outlined a policy and guidelines on the use of OER in Malaysia [6]. The awareness on OER in this study was found to be rather low (37%) and all

institutions in Malaysia should have more awareness campaigns on this. Table 3 reports on the percentage of awareness in OER. On the other hand the awareness on lecture capture was high (72%) but their usage is low. Seventy nine percent of them said that this is their first time using lecture capture. Table 4 and Table 5 show the awareness on lecture capture and the percentage of first-time user.

Table 3: Awareness on OER

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	25	37.3	37.3	37.3
No	42	62.7	62.7	100.0
Total	67	100.0	100.0	

Table 4: Awareness on lecture capture

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	48	71.6	71.6	71.6
No	19	28.4	28.4	100.0
Total	67	100.0	100.0	

Table 5: First time user of lecture capture

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	53	79.1	79.1	79.1
No	14	20.9	20.9	100.0
Total	67	100.0	100.0	

Table 6 shows the perceptions of students on the use of lecture capture. About 61% of them considered lecture capture convenience and easy to use; 54% of them opined that lecture capture can replace missed lecture; more than 10% of them did not use lecture capture in their preparation of homework and exam (it needs a longer duration for them to familiarize with lecture capture); just slightly half of them said that they could use lecture capture to clarify difficult concepts (it takes longer time for them to know its benefits); about 60% of them could not see how lecture capture could be used as a supplement lecture; about 13% of them considered lecture capture could be used to replace normal lecture; majority of them (90%) opined that lecture capture should not use as an excuse for absent from normal lecture (it shows a very positive attitude towards the use of lecture capture); slightly half of them (55%) thought that lecture capture is an extra learning; 70% of them objected that lecture capture was considered useless and time-wasting but 21% of them opined that it was useful but time-consuming and slightly more than half of them (51%) considered lecture capture is useful in their studies. From the above analysis the use of lecture capture is still in an infant stage where benefits of using lecture capture still yet to be valued by students.

Sequencing of the teaching and learning process is an important pedagogy. It was found that about 39% of the students would like to have lecture capture after normal lecture and 45% of them use it as a revision. Only about 15% of them preferred to have it before normal lecture. Table 7 depicts the situation on when to have lecture capture.

Sixty one percent of the students did not see the necessity to have lecture capture for all the topics. This shows that they considered lecture capture just as a supplement and not a replacement. Table 8 shows the students' perception on whether to have lecture capture for all topics related to the course of study. Majority (70%) of them rated the lecture captures given to them for this study to be excellent or good. Table 9 shows the rating on the given lecture captures for this study. Majority of the students have adequate computer skills to go online and offline, therefore it is not a problem for them to explore and use the given lecture captures in their studies. Table 10 shows that 87% of them said they did not require help on using lecture captures.

Table 6: Respondents' perceptions on the use of lecture capture

Perception on	SD (Strongly Disagree)	D (Disagree)	N (Neutral)	A (Agree)	SA (Strongly Agree)	Total (%)
Convenience & ease of use	3 (4.5%)	2 (3.0%)	21 (31.3%)	31 (46.3%)	10 (14.9%)	67 (100%)
Replace missed class	3 (4.5%)	6 (9%)	22 (32.8%)	26 (38.8%)	10 (14.9%)	67 (100%)
Use to prepare homework & exam	2 (3.0%)	5 (7.5%)	31 (46.3%)	23 (34.3%)	6 (9.0%)	67 (100%)
Clarified difficult concepts	3 (4.5%)	13 (19.4%)	17 (25.4%)	26 (38.8%)	8 (11.9%)	67 (100%)
Use to supplement lectures	3 (4.5%)	11 (16.4%)	26 (38.8%)	24 (35.8%)	3 (4.5%)	67 (100%)
Replace normal lecture	9 (13.4%)	21 (31.3%)	28 (41.8%)	8 (11.9%)	1 (1.5%)	67 (100%)
Excuse to absent from normal lecture	20 (29.9%)	31 (46.3%)	9 (13.4%)	5 (7.5%)	2 (3.0%)	67 (100%)
Use for extra learning	1 (1.5%)	1 (1.5%)	28 (41.8%)	22 (32.8%)	15 (22.4%)	67 (100%)
Consider useless & wasting time	17 (25.4%)	30 (44.8%)	16 (23.9%)	4 (6.0%)	0 (0%)	67 (100%)
Consider useful but time consuming	3 (4.5%)	24 (35.8%)	26 (38.8%)	13 (19.4%)	1 (1.5%)	67 (100%)
Consider helpful in my study	1 (1.5%)	4 (6.0%)	28 (41.8%)	26 (38.8%)	8 (11.9%)	67 (100%)

Table 7: Sequencing lecture capture

	Frequency	Percent	Valid Percent	Cumulative Percent
Before normal lecture	10	14.9	14.9	14.9
After normal lecture	26	38.8	38.8	53.7
During revision	30	44.8	44.8	98.5
Others	1	1.5	1.5	100.0
Total	67	100.0	100.0	

Table 8: Request lecture capture for all topics

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	26	38.8	38.8	38.8
No	41	61.2	61.2	100.0
Total	67	100.0	100.0	

Table 9: Rating on the lecture capture used

	Frequency	Percent	Valid Percent	Cumulative Percent
Excellence	7	10.4	10.4	10.4
Good	40	59.7	59.7	70.1
Neutral	20	29.9	29.9	100.0
Bad	0	0	0	
Very Bad	0	0	0	
Total	67	100.0	100.0	

Table 10: Require help on the use of lecture capture

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	9	13.4	13.4	13.4
No	58	86.6	86.6	100.0
Total	67	100.0	100.0	

The following are the answers for the research questions:

- Do students have adequate computer facilities for using lecture capture?
  The study shows that all students are equipped with computers and they are able to connect to Internet. Students are well-equipped with computers and online facilities.
- What are their online habits?
  They like social media, watching YouTube video, retrieve e-mail and play online computer games. Watching YouTube videos can be used as a platform to implement lecture capture for educational purposes. Students are encouraged to search and view lecture captures that related to their studies.
- What is the status on students' awareness on OERs and lecture captures?
  Awareness on OERs and lecture capture is low. Extra effort is needed to educate students on how to search and use OERs and lecture captures in their studies.
- What are the students' perceptions on lecture capture?
  They have positive attitudes and perceptions on lecture capture. This is a good sign and they are ready to have more lecture captures to facilitate in their learning processes.
- How to sequence lecture capture for teaching and learning?
  They prefer to use it after lecture. Studies have shown that lecture captures could be more beneficial if use before the lecture proper, because "opportunities favor a prepared mind". If they prepare their lessons using lecture capture before the lecture proper they could have better retention and fruitful discussion.

6. Conclusions and Recommendation

This study shows that the level of awareness among students on lecture captures and OERs remain low, therefore extra effort is needed to educate students on the use of lecture capture and other OERs. The results also show that they have positive attitude and perceptions on lecture capture. For example they feel that lecture capture is not to be use as a replacement for normal lecture. This alleviates the worry that students will not come for normal lecture if lecture captures were given to them. The perceptions on convenience, ease of use, replace missed lecture, absence from normal lecture, clarify difficult concepts, extra learning and its usefulness are found to be positive. There are certain perceptions need to be further investigated, like appreciation on lecture capture during revision and the use of it as a supplement in normal lecture. Therefore, it is recommended that further research should be carried out to find out answers for these grey areas as well as to extend the duration of study to at least one semester so that its impacts are observable.

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