

Evaluation of the Effectiveness of E-Lectures on Students' Learning

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Abstract

With the advent of new technologies, “digital learning and teaching” has been gaining more attention and is becoming an inseparable part of new curriculums. Although most of the studies demonstrate the effectiveness of Electronic-lectures (E-lecture) in improving learning and teaching, there are experts who warn against the trend of changes claiming that the ‘live’ lectures may very soon become obsolete. They argue that E-lectures do not provide an interactive environment required for learning and teaching.

This paper is intended to investigate the effectiveness of E-lecturers on learning of Master level Electrical and Electronic students at Swansea University, UK. Since most of the previous research in this area lacks the students’ view on the matter, a survey will also be used to hear the students’ voices on the concept of digital learning/teaching.

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Introduction and Motivation

Since September 2013 the author has been developing and teaching a module called 'Power Systems' at Swansea University. The final exam of the module consists of four questions:

Question 1, which is compulsory, has four subsections covering various chapters of the module.

Then, the students have to answer two questions out of the remaining three. The three remaining questions (i.e. Q2, Q3, and Q4) are, respectively, related to Chapter 2 (synchronous generator), Chapter 3 (fault calculations) and Chapter 4 (stability analysis). Speaking from the last two years' experience, it seems that chapter 4 is slightly more difficult for students compared with the two other chapters; and therefore the students have a tendency to answer the two other questions (i.e. from chapters 2 and 3). For example in 2013, less than 20% of the students attempted Q 4 (which is from chapter 4) while in 2014 no one even tried to answer the question. Moreover, the average mark of Q4 (in 2013) was 20% less than the average of Q2 (in the same year) and 17% less than that of Q3 (in the same year).

Since chapter 4 contains of very important topics, in order to make sure that students do not completely ignore it, the author always inform them that at least one part of Q1 (which is compulsory) will be from Chapter 4. However, the results of the last two years show that; the part of Q1, which is related to chapter 4, has the lowest average (and the lowest attempt despite being compulsory). This may indicate that students simply ignore the entire chapter 4.

Therefore, the author has been looking for ways of helping the students to learn this relatively difficult, and yet important, chapter better and encourage them to answer the question related to it in exam. Digital teaching and learning seems to be a promising aid for the challenge mentioned above. This paper is organised as follows: next section explain the methodology of the study while section 3 reviews previous research in this area. The outcomes of the survey and the students' exam results are explained in section 4, and section 5 draws some conclusions.

Methodology

It was decided to make E-lecture for the entire chapter 4 (including both theory and examples) and upload them on Blackboard prior to teaching the topics in the class. It was emphasised to the students that the videos are not aimed to substitute the normal 'live' lecturers, but as an extra help.

The whole chapter was taught in four videos, each about one hour. The videos in the author's office using Camtasia (<https://www.techsmith.com/camtasia.html>) which is a professional screen recording software while use Snowball Bluemic (<http://www.bluemic.com/snowball/>) to record the voice. The videos did not include a picture of the author (i.e. no camera was used). Wacom Intuos Pro (<http://www.wacom.com/en-us/products/pen-tablets/intuos-pro-se>) was used to write on the PC's monitor, which was recorded by Camtasia.

Therefore, beside the normal lectures' notes, that are always uploaded prior to the lectures, the students have four videos covering the entire chapter and its examples. This gives them the facility to watch it several times and if needed rewind it to understand the topic better.

The objectives of this study are to see if the E-lectures:

increases the percentage of students answering Q4,
 increases the average mark of Q4

In order to hear the students' views on the whole process, a questionnaire, which is shown below, was designed and handed to the students:

Questionnaire:

1- What method of delivery do you think is the most helpful in learning?
 (Please note that the university's standard of one office hour per week is assumed to be available for all options below)

Only E-lectures for the entire module including theory and examples.	
Only normal lectures for the entire module including theory and examples.	
E-lectures for theory and normal lectures for examples.	
E-lectures for examples and normal lectures for theory.	
Both E-lectures and normal lectures for the entire module including theory and examples.	

Or, if you prefer any other combination, please describe it here.

Why do you think your chosen option is the most helpful?

- 2- Please describe the advantages of having E-lecture?
- 3- Please describe the advantages of having normal lectures?
- 4- How could the E-lecture be improved?

It should be noted that the students did not know anything about the reasons of choosing this particular chapter to make the videos in order to make sure that similar to previous year they can freely choose to answer or not to answer Q4.

Pedagogical study

Most of the pedagogical studies demonstrate positive results and feedback (both from students and lecturers) toward using 'digital teaching/learning'.

M. Asensio et al. (2004) argued that 'image', 'interactivity' and 'integration' ('Three I's framework') can be interpreted as the 'added values' of the media in an educational environment. By 'image' they mean that the added 'visual richness' that comes with digital media. They explained that 'interactivity' consists of three characteristics: access (or availability), choice, and control (ability to start, stop or rewind).

Most of the advantages of E-learning for students, which are mentioned in literature, are related to the fact that it will give them the freedom to access the material

whenever and wherever they want to. It also enables them to start, stop and rewind the video/audio as many times as they want to. Some of these advantages are summarised by J.A.D. Balfour (2006) as follows:

E-lectures are especially beneficial for hearing-impaired and non-native speaking students

The ability to access lectures whenever and wherever suits the students. This can be very useful for students who cannot attend lectures at a particular time of days (due to a part time job, for example) or who are not at their best at a particular time of days (e.g. some people who aren't 'morning people')

Availability of the videos/audios at will which becomes more beneficial when doing a coursework or preparing for exams

J.A.D. Balfour (2006) also summarizes some advantages of 'E-teaching' for lecturers which are as follows:

The lecturer can improve his/her performance through watching (or listening to) the videos (the audios)

Improve the students engagement through providing them with the videos prior to the lecturers

By doing this, the normal 'face to face lectures' can be used for more important and complex issues

Truth to be said, not everybody is supportive when it comes to 'digital teaching/learning'. For example:

J. Williams and M. Fardon (2005) argued that having access to video and audio files of lectures will discourage the students from attending the actual 'live' lecturers.

Regarding this issue, it is worth-noting that the author did not notice any change in the number of attendees (compared to the chapters with no videos), even though the students have had access to the videos prior to the lectures. The fact that this study is applied on master level students cannot be very effective since D.Simon, et al (2009) also did not notice any drop in students attending lectures (compared to years before) despite of applying their project on a level-1 module.

E. Bennett, N. Maniar (2007) believe that using e-lectures will make the students too much dependent on a 'repeating' lecture and prevent them from becoming an independent learners. The author thinks that this can be potentially an adverse side effect of E-lecture, which requires more studies. Moreover, it may make the students to pay less attention in the class hoping that they can understand it by watching the videos. However, these side effects might be mitigated by changing the students' view on E-lectures. They must be taught that E-lectures are aimed to answer the remaining questions they might have after a face to face lecture, not as the sole source of learning nor to substitute the live event.

Outcomes

This section explains the outcomes of this study from students' perspective and their exam results:

(a) *Outcome from the students' survey:*

The survey (shown in section 2) was emailed to the students and they were asked to either email the author the completed questionnaire or put it in his letter-box (in order to be anonymous, if they want to). The convergence rate was 86.4%, which was more than the author's expectation. The survey consists of the following four questions:

Question-1 asked the students to choose their favourite approach in teaching, out of the following options:

Only E-lectures for the entire module including theory and examples.

Only normal lectures for the entire module including theory and examples.

E-lectures for theory and normal lectures for examples.

E-lectures for examples and normal lectures for theory.

Both E-lectures and normal lectures for the entire module including theory and examples.

Table I shows the result of question 1. As it can be seen, nearly 50% of the students prefer both E-lecture and normal lecture for the entire module while none of them would like only E-lecture. The second place (with 27.3%) belongs to those who would like normal lecture for theory and E-lecture for example parts. One of these students justified their choice by mentioning that 'theory is more difficult than examples' so it would be better to have face-to-face lecture for theory. A very interesting outcome is that 9% of the students would rather normal lectures for the entire module i.e. no E-lecture whatsoever (note that this is twice of those who prefer E-lectures for theory and normal lecture for examples part). They argued that they are worried that 'E-lectures take over normal lectures'. Moreover, they believe that they could watch similar videos on 'youtube'. The concern that the current approach of digitalising learning and teaching may obsolete face-to-face lectures in future is a valid one, and the survey shows that no student like it. It is worth to emphasise that the survey clearly mentioned that 'the university's standard of one office hour per week is assumed to be available for all options'.

Table I. Outcomes of the survey

Delivery method	a: E-lecture	b:Normal lecture	c:Theory: E-lecture Examples: normal lecture	d: Theory: normal Examples: E-lecture	e: both
Percentage	0	9.1	4.5	27.3	45.5

Question-2 asked the students to mention some advantages of E-lecture.

Almost all of the mentioned points were related to the fact that videos are easily accessible at will, hence, they can study at their own pace wherever/whenever it is more convenient to them.

Question-3 asked the students to mention some advantages of normal lecture.

Most of the students mentioned ‘live interaction’ as the main advantage of normal lectures. They also pointed out that being in a lecture make them concentrate better. Moreover, other students may ask interesting questions that one may not notice on their own.

Question-4 asked the students to suggest ways of improving E-lecture.

Some of the students’ suggestions are listed below:

Adding some sort of interactive section for discussions/comments

Shorter videos (suggested durations: 45 and 30 min)

The lecturer appears in the video (not just his/her voice)

Recording normal lectures as e-lectures

Adding more examples

(b) Outcomes form exam:

Table II compares the past three years’ exam results of the question related to Stability Chapter (i.e. Question 4):

As it can be seen, 45% of the students attempted to answer Question 4 while no student answered it last year and only 18% answered it in 2013. The table also shows increases in both average and maximum mark of the question. The only negative result is the reduction in minimum mark which is, to some extent, justifiable as more students attempted the question in 2015 compared to 2013.

Table II. Comparison the past three years’ exam results of the question related to Stability Chapter.

	Attempted	Average mark	Maximum mark	Minimum mark
2015-2016	45%	58.8%	96%	16%
2014-2015	0	NA	NA	NA
2013-2014	18%	40%	88%	20%

Conclusions

Table II demonstrates that after this teaching intervention the students have a better feeling towards Stability Chapter since much more students attempted question 4 compared with the last two years. Moreover, the survey also shows that most of them prefer to have both E-lecture and normal lecture for the entire module, which was the approach of this teaching intervention.

Since making videos for both theory and examples can be very time consuming, according to the survey, it is recommended to start with the students’ second choice i.e. making e-lectures for the example part. Moreover in many cases, when teaching the theory, it is required to make longer videos, which is contradictory with the suggestion from some students.

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