EFFECTIVE USE OF INTERACTIVE VIDEOS AS AN EDUCATIONAL TOOL IN HIGHER EDUCATION – AN ASIAN CONTEXT

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Abstract

The significant impact of interactive videos in higher education is noticeable with growing interests from local and private universities setting priorities in providing and exploring video development and management tools, up-skilling its academics and investing in video technologies in their institutions. With the growing awareness of available video contents on the World Wide Web, there is now a question of whether interactive videos are adoptable in institutions of higher education as a tool to enhance learning, as well as providing the pedagogical benefits in active learning. Using interactive videos as an educational medium has gained acceptance by many institutions of higher education to be an alternative or as a supplement to the traditional classroom learning. However, this technology is not being adopted as fast as it should be, comparable to institutions of higher education in other developed countries. The underlying factors which contribute to this impediment are due to the insufficient facts and findings of the role of videos in knowledge development and critical thinking. This, alongside with the lack of technical skills in video curating and digital content development has set back the effective use of interactive videos in the classroom.

While the awareness and increased availability of video content are recognized, the effective use of it is still contentious as videos have been related to passive learning. This study sought to assess the perceptions and thoughts of academics in higher education towards the use of interactive videos as an effective medium and how it can be aligned with strategies in promoting active learning in the classroom.

Keywords: Educational videos, interactive videos, Multimedia learning, non-linear videos, Malaysia.

1 INTRODUCTION

Twenty First -century learning for higher education in Malaysia has seen a significant shift towards the increasing use of educational technologies in the classroom. The rapid development of computer facilities, capabilities of smartphones and mobile devices as well the improvement in Internet and broadband penetration has become the enablers for these new educational technologies to emerge and to be widely used. One of the very critical uses of such technology in the classroom is the use of videos in education both as a resource for self-learning but more as a supplement to course material.

Video-based learning is nothing new to the classroom environment, tracing back its earliest usage during the Second World War in the 1940s.[1] Malaysia has just a little more than a decade in having access to high-speed internet (broadband), with a humble beginning of less than one per cent broadband penetration in 2004. This is in comparison with 40 per cent in Singapore and 60 per cent in South Korea. Malaysia’s Internet penetration in 2018 is now at 85.7 per cent.[3] The recent rise in broadband penetration and digital literacy has seen a shift of interest towards the use of videos to enhance learning. This is more so with the affordability and increased usage of devices such as smartphones, tablets and personal mobile computers.[3]

The use of videos in lectures in higher education has been steadily growing in popularity in many institutions of higher education in Malaysia. This medium is heavily promoted to enhance the learning process, not only in the classroom but now, with students having access to mobile technology, more so outside of the classroom. As it allows two learning styles to be used simultaneously via auditory and vision, Videos are the preferred medium in blended mode of learning, pre-class learning activities as well as online learning. Research on the use of videos in education indicates that it is one of the critical factors in achieving learning outcomes.[2]

With a paradigm shift in 21st-century education and the adoption of active learning strategies, academics are now revisiting the effective use of videos in the classroom. Traditionally, videos are used as a supplementary resource as they are deemed to be passive and less engaging. The
development in multimedia and video technologies has now made it possible to design, curate and produce “interactive” videos to be used as a powerful educational tool in teaching and learning.

Interactive videos are generally annotated videos, in which the interactivity of the video is inserted into sections of the video as an overlay. These overlays introduce additional interactions over the standard video control: pause and rewind. According to Kolas, as cited by Benkada and Moccozet [10], “the insertion of interactive annotations in videos shifts learners from the state of a passive viewer to the one of an active reader.” Tools such as H5P is popular in creating such interactivity within a video. H5P is supported in popular learning management systems such as Moodle and it provides various types of annotation for videos.

The use of interactive videos in higher education strengthens communication between learners and their learning environment as well as providing individual learners with the ability to self-pace their own learning.[2] A study has revealed that the current generation of students, more specifically Generation Z, prefers intrapersonal learning, where they like being able to learn independently and at their own pace. The same study also found that Generation Z learners access foundational information from websites and videos and learn on their own instead of going to classes to gain baseline knowledge.[7].

In this study we set out to investigate the impact of adding interactivity to educational videos and how useful Asian teachers and students find this interactively as an added tool in their teaching and learning in Higher education Degree courses.

Such research objectives of this study as above revolve around the following specific research questions:

1. What is the impact of interactive video in enhancing student learning in higher education in Malaysia?
2. What are the enablers and barriers to using interactive videos in teaching and learning?

This study was conducted in a private institution of higher education in Malaysia which offers both STEM (science, technology, engineering and mathematics) and non-STEM undergraduate programs. The university has implemented a high degree of technological enhancements in the delivery of their programs with all courses delivered through a blended learning format. This is facilitated by Moodle, which is the university’s Learning Management System.

Course units, as case studies were chosen which were enhanced through the incorporation of interactive videos as part of their course to study its impact on teaching and learning.

2 METHODOLOGY

The study population was selected based on individual units from a range of undergraduate programs across the university which has been enhanced by incorporating interactive videos in Semester 1, 2019.

To answer both research questions regarding the evaluation of the impact of interactive video as well as the enablers and barriers in using interactive videos in teaching and learning, data was collected through qualitative methods by series of interviews and focus groups.

2.1 Study Design

This study used a qualitative design in exploring the perception of lecturers and students regarding the effectiveness of using interactive videos in their teaching and learning. A grounded theory (GT) approach was used, where qualitative data is obtained from individual interviews with lecturers and a focus group was conducted with students.

2.2 Participants

Lecturers

The lecturers selected has gone through training in using active learning strategies in their classrooms and has been exposed to the use of interactive videos for education. The training has specific demonstrations of the utilization of interactive videos for teaching and learning. Interview sessions were conducted with individual lecturers for qualitative feedback on their experience of using interactive videos in their teaching.
Students

Participants for student focus groups were selected from the School of Business where the unit lecturer has used interactive videos as a tool to support teaching. Students were asked to volunteer for a focus group discussion from a cohort of 157 students in Semester 1, 2019.

2.3 Data collection and analysis

Interview and focus group sessions were audio recorded and converted into a transcript for analysis. The data is then examined to identify similarities to form themes.

3 RESULTS

Case Studies

There were 6 units that were selected which were enhanced through the incorporation of interactive videos as part of their course. Different types of interactive components were incorporated into the videos for such unit enhancements. The lecturers converted parts of the weekly teaching syllabus into a short interactive video, using various types of combination of interactive components of interactive quiz, Navigation hotspots, Branches (Table 1) as follows:

Interactive Quiz

The interactive quiz is one of the features that can be embedded within a video to allow students to provide feedback or response. It has an automated feedback mechanism which makes it a great tool for teaching and learning.

Navigation Hotspots

The difference between a linear video from an interactive video is the navigational hotspots that can be created throughout the video. Viewers can go back and forth into different segments of the video or linking it to another webpage by clicking on the hotspots.

Branches

Viewers have the option to select multiple branches at a junction of a video to decide which content they want to explore. This allows for self-paced viewing.

It is noted in Table 1, that interactive quizzes that are embedded into the videos are most widely used, while only one instance of interactive branches were used in the sample of interactive videos reviewed.

<table>
<thead>
<tr>
<th>Types of interactive components</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive Quiz</td>
<td>6</td>
</tr>
<tr>
<td>Navigation Hotspots</td>
<td>4</td>
</tr>
<tr>
<td>Branches</td>
<td>1</td>
</tr>
</tbody>
</table>

Out of the 6 lecturers interviewed, only 1 lecturer has independently designed and produced an interactive video for the course. The remaining 5 lecturers produced on average one to two interactive videos with the assistance of an Educational Designer. The interactive videos were created using the H5P plugin embedded within Moodle.

As part of the active learning strategy, the interactive videos were used as a pre-class learning activity where it is accessible by students from Moodle.

3.1 Demographics

Participants

Six lecturers (4 females, 2 males) from four schools (School of Business, School of Information Technology (IT), School of Engineering and School of Pharmacy) participated. The participants had
the assurance that their identity will be kept anonymous for this study. Their contributions to this study are voluntary and without any incentive.

Table 2. Lecturer demographic data (n = 6)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>66.6</td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Business</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>School of IT</td>
<td>1</td>
<td>16.6</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>1</td>
<td>16.6</td>
</tr>
<tr>
<td>School of Pharmacy</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Five students (2 male, 3 female) from the School of Business participated in a focus group discussion. In this focus group, the unit lecturer has developed two separate interactive videos which were introduced to the students in Week 4 and Week 8 of the semester as pre-class learning activities. The focus group took place in Week 11 of the semester and all of the students have had experienced with interactive videos. The student’s contribution to this study is voluntary and without any incentives.

3.2 Result from Interviews

Generally, all the participants responded to the interview questions they were asked based on their personal experience in using and designing interactive videos in their teaching. The interviews were recorded and the transcribed for analyses. The objective of this analysis is to develop a theme around the impact of interactive videos in education and if this medium is effective as a teaching and learning tool. The analyses of the interview is described below according to the main focus of the two Research question.

3.2.1 Impact of interactive videos

It was found that the lecturers interviewed were strongly positive about the use of interactive videos in their teaching. The lecturers are confident that the impact of interactive videos benefits the students learning and is seen as a creative approach to increasing student engagement with the content.

Most of the lecturers felt that the use of interactive videos is has a positive effect on their teaching. These positive perceptions indicated that interactive videos help with teaching and delivers a creative way of explaining complex scenarios. Some of the interviewed lecturers have mentioned that:

“Effective way to keep students interested and better engagement with content” (L1)

“It helps with teaching and the video can deliver content that is more complex to understand in a creative way” (L2)

“Using interactive video allows me to direct students to specific part of the content and use pop up questions that prompts students to check on their understanding” (L2)

One of the lecturers felt that the use of interactive videos is effective in promoting self-learning among students. One of the salient issues that came out of this study was that some of the lecturers are using interactive videos as an in-semester formative assessment:

“I can combine formative assessment through interactive video so that students get a rich experience while learning” (L2)

The lecturer found the embedded interactive quiz into the video useful in providing students with better engagement with the content they are viewing.

This interactivity of the videos, it is surmised, ensured that the students didn’t lose focus on the objective of the learning.
All of the lecturers in the sample practices blended learning in their classroom. This concept of learning has been widely adopted in many institutions of higher education over recent years. The use of blended learning with videos provides students with beneficial learning experience as cited by Carmichael, Reid, and Karpicke.[5]

3.2.2 Barriers to using interactive videos

Just with any advancement in educational technologies, there are bound to be barriers in fully implementing them effectively. There are generally several key concerns with some of the lecturers in this sample. While the use of videos is popular in institutions of higher learning, designing an interactive video for use in teaching has its constraints.

One of the key barriers is the skills in producing a video specific to their syllabus in teaching. While applying the interactivity to the video is manageable, the actual video requires experience in video production. Most of the content used by the lecturers are obtained from sources on the Internet. Two of the lecturers have indicated that it is difficult to find specific content that is appropriate for the syllabus. A lecturer mentioned that;

“It is difficult to find good content especially Accounting and Auditing that can be converted to an interactive video. (L2)”

The lecturer also further commented that available videos that are from YouTube are mostly recorded lectures from other institutions of higher learning and it is not appropriate to be used as a base video for her class.

Video production is indeed time-consuming and requires a skill set that is usually acquired from training and experience. All of the lecturers in this sample are not trained as video producers and have no prior experience in producing a video. It is also critical that the video used for education needs to be of a high standard to ensure that the student gets the best experience. Four out of the six lecturers has indicated the time factor as one of the barriers to producing an interactive video for teaching.

One of the interviewed lecturers has indicated that the use of interactive video is not so appropriate for classes like computer programming which involves the demonstration of computer codes. While many of the interviewed lecturer’s responses indicate that interactive videos have a positive impact on teaching and learning, it is also worth noting that “there are still lecturers who do not yet have the skills, experience, confidence, understanding or expertise to teach effectively with and through video”. [9]

3.2.3 The enablers of using interactive videos in teaching

It is perceived that the interviewed lecturers agree that the use of interactive videos in their teaching has seen an increase in student engagement. Interactive videos that are designed to be used as pre-class activities have higher participation from students. For instance, some of the lecturers mentioned this:

“Student like it and seems to have more participation in the pre-class activities when using interactive videos” (L3)

“Student generally participated in viewing the videos for pre-class and is asking more questions during class sessions. This is good because students are actually watching the content” (L1)

“Students feel that they have achieved something after watching the interactive video and they can remember the content better” (L2)

Student engagement with the content is critical in enhancing the learning experience. Multimedia and interactivity in education have been proven to increase knowledge retention [2]. This is even more challenging in flipped classrooms where students are not engaged face to face with the lecturer.

One of the very powerful types of video annotation is the ability to embed interactive quizzes into the video, enabling formative assessments to be linked directly to the content in the video. With learning analytics, lecturers are then able to analyse if the students are achieving the learning objectives of the activity.

It is also noted that with the assistance of an Educational Designer, lecturers were more motivated to develop interactive videos for teaching. The educational support and training provided to the lecturers
have allowed them to broaden their views on the types of interactive tools that can be used along with videos for their teaching and learning.

While the impact on teaching and challenges of producing an impactful interactive was analysed as above with the lecturers feedback, the impact on student experiences and impact on learning was analysed in this study through focus group discussion with students. The analyses of the Focus Group is described below according to the main focus of the two Research question.

3.3 Result from Focus Groups

3.3.1 Perceived Learning Experience

The students in the focus group generally have a positive experience while using interactive videos in their learning during the semester. Students claimed that the use of interactive video in their learning as creative, interesting, motivating and effective.

Some of the students had also mentioned that the use of interactive videos is more effective in remembering the content as compared to traditional passive videos that were used in the past. This is well supported by the comments that came from students during the focus group:

“I can remember the content better because of the game-like experience from the interactive video. It is more creative and I actually can interact with the video I am watching” (S2)

“The question in the quiz forced me to give the correct answer before I can continue watching the video. In a way this is good because I can remember the content more after watching” (S5)

The interactive quiz component embedded into the video has enabled students to very quickly test their knowledge of the content while still learning as they proceed into other segments of the video. Student finds this useful as to be able to keep track of information that they are supposed to understand from the content and to also be able to re-watch the video as many times as they need until they are able to get all the correct answers to the quiz.

3.4 Discussion

Overall, the data collected from the study provided further findings of how interactive videos are being used in the teaching and learning environment for higher education. Many studies have shown that interactive videos are perceived as an effective tool to support teaching and learning. However, It is also yet to be determined through research about which type of interactive component in a video is effective, and if this is applicable to all discipline of studies in the teaching and learning environment. A study by Gedera and Zalipour “observed that video in teaching and learning tends to be discipline-based”.[6] With the increased use of blended mode learning, flipped classroom and active learning approach, the critical role of interactive videos as an effective teaching and learning tool can be further explored.

An annual survey by Kaltura on video in education in 2018 reveals that:

“97% think that interactive videos (in which content changes depending on viewer behavior) is going to be important to education in the future. Similarly, 97% anticipate self-paced curriculums. Giving learners more influence over their own learning and personalizing learning paths is clearly going to be a major force.” [8]

3.5 Limitations

The study and findings are conducted with some limitations. The first limitation is the size of the sample population. Lecturers that were selected are based on the criteria that they have participated in training in creating and using interactive videos for education. Due to time constraints, only focus group sessions were conducted with students. Quantitative data with surveys to the larger population of impacted students will be able to give a more accurate finding of how interactive videos are perceived.
4 CONCLUSIONS

The findings of this study indicate that the usage of interactive videos has a positive impact on teaching and is perceived as an effective tool in higher education. It is also perceived that interactive videos increase student engagement when the interactivity is designed creatively to stimulate participation from students. The additional interactivity compared to traditional linear videos is found to be more effective in ensuring that the navigation of content is controlled by the lecturer.

However, it is to be noted that designing the interactive component of the video is only one part of the challenge. Sourcing or producing the actual video content is more difficult as many ready-made resources are not always the best content suited for each individual topic in the lecturer’s unit. New York University stated that “in the future, faculty expect to have more video available in digital form for streaming and download”.[4] Although this assumption is true, it may not be fully applied to some of the units taught by individual lecturers as the videos used are content-specific.

Future studies into the use of interactive videos in higher education will include the use of learning analytics which can be implemented within the learning management system for better understanding of how a student uses interactive content for their learning.

REFERENCES


