

THE EFFECTIVENESS OF BLENDED LEARNING: A CASE STUDY

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Abstract

Recent policy announcements by the Thai government: Thailand 4.0, and its education component: Education 4.0, advocate the use of innovation and digital technology in schools and universities to improve the quality of education. We explore here the effectiveness of blended learning at an institute of higher education with a case study for one subject taught at the undergraduate level at Assumption University. Blended Learning in this study is defined as supplementing traditional classroom lectures with an online eLearning course in the same subject, using the same lecturers and course materials. Students had the opportunity to watch online video lectures before and/or after attending classes throughout the semester. At the end of the semester an online survey was conducted to determine the frequency of access to the online course, the level of student satisfaction, and the effectiveness of blended learning in terms of their understanding of the subject. Lecturers were interviewed to determine their view of the success or otherwise of the program and to inquire about exam results. Evaluation of survey questionnaires and lecturers' opinions revealed that students were satisfied with the program because it had impacted positively on their understanding of the subject and had improved their exam results above prior expectations.

Keywords: eLearning, Online Learning, Blended Learning, Thailand 4.0, Education 4.0

INTRODUCTION

The Graduate School of eLearning (GSeL) was established in 2002 within Assumption University to offer online learning (eLearning) through the Internet for graduate studies. All eLearning systems use software

called Learning Management System (LMS) to connect experts (lecturers) who provide course content: text, audio, and video materials, with students who view these items online.

Moodle was recommended for the development of courseware in this case

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because it was the most promising open source LMS available. Moodle is used for blended learning, distance education, flipped classrooms and other eLearning projects in schools, universities, workplaces and other sectors (Costello, Eamon, 2013). Moodle offers a wide range of functionalities for managing groups of students and instruction materials. (Yuan Gao, 2015).

The Moodle open source platform is free with no pop-up advertisements, allows full control of options and settings and access to source code with the right to edit the code. It was developed using PHP script and MySQL database, an open source programming language and database system that can be run on any platform, i.e. Windows servers, and Linux and Macintosh computers under Apache which is also an open source web server.

Following the adoption of Moodle as the LMS platform a team of four people: an instructional designer (ID), a programmer, a web/graphic designer, and a video editor was formed to work with content experts to produce online courseware, which was then placed on a server belonging to GSeL running the LMS for easy access by students.

BACKGROUND

The medium of instruction at Assumption University is English. Undergraduate students come from many countries and have different proficiency levels in English. They attend classes with subjects taught by lecturers of many nationalities. A number of students have difficulty understanding subject content because English is not their native language and there are fast and slow learners in every classroom. Some students who find a subject difficult due to their lack of academic

background attend tutorial classes to enhance their understanding. Many lecturers try to find ways to improve the quality of their lectures to enhance the learning of their students. A number of lecturers have in the past suggested recording lectures for students to listen to after the class.

In line with That government policy to improve the quality of education by innovation and the use of digital technology it was decided to develop blended learning for one undergraduate business course. The term “blended learning” is used when eLearning or online learning is combined with conventional face-to-face classroom teaching. The former director of the Technology Unit of GSeL worked with lecturers in the faculty of Business Administration who had a positive view of blended learning and were willing to develop an online course to be used as a supplement to classroom lectures. Assumption University requires at least 80% student attendance in classrooms. It was felt that an online course would be useful for those who had missed a lecture or having difficulty understanding a lecture because they could view online content at their own pace, as many times as they liked.

LITERATURE REVIEW

Blended learning is defined in different ways. For example: Chan (2008) defined it as the combination of elements of classroom training, with live and self-paced eLearning, and with advanced supportive learning services in a manner that provides an experienced tailored to each student’s needs. Mohammed Nasser Hassan Ja’ashan (2015) defined blended learning as face-to-face class meetings, with some class sessions replaced with online instruction and Hui Liu (2016)

defined it as the integration of multiple teaching means, teaching media, and teaching environments.

In research at Columbia University in New York, “Blended Learning Improves Science Education” Stockwell et al, 2015, concluded that “Blended learning is an emerging paradigm for science education that has not been rigorously assessed.” The authors performed a randomized controlled trial of blended learning finding that in-class problem solving improved exam performance, and video assignments increased attendance and satisfaction.

Osgerby (2013) investigated students’ perception of the introduction of a blended learning environment and concluded that while students appeared to have a positive attitude to the adoption of the new program, they preferred face-to-face lectures and step-by-step instruction. Naaj et. al. (2012) considered student satisfaction to be an important factor in measuring the quality of blended learning. Their study proposed that students’ satisfaction is influenced by a combination of factors, which include the personality of the instructor, the technology, class management, and the quality of interaction and instruction.

Torrissi-steele and S. Drew (2014) concluded from a comprehensive survey of 827 articles on blended learning that there is still a scarcity of blended learning research describing current academic practices and that effective blended learning implementation still requires investigation.

Most research on blended learning has involved programs where some online sessions are used as replacements for parts of a class lecture program. Based on a review of the literature we believed that learning could improve the quality of teaching and learning if

implemented carefully to supplement existing classroom lectures which was done in this case.

METHODS

Blended learning was investigated as a supplement to existing course materials, for an undergraduate course in School of Management and Economics at Assumption University of Thailand. The online course lectures had exactly the same content that was taught in the classroom.

OBJECTIVES

1. To develop an online course for one of the courses offered at Assumption University.
2. To explore the effectiveness of blended learning for the developed course.
3. To find out students’ satisfaction of using this blended learning.

QUESTIONS

1. Is blended learning effective in improving students’ learning?
2. Are students satisfied with using blended learning?

RESEARCH DESIGN

Data was collected with an online questionnaire given to the students at the end of a full semester. The purpose of the questionnaire was to determine how effective they thought the blended learning was, how satisfied they were, and if they would be willing to have more blended learning for their other courses. A qualitative interview was conducted with the lecturers teaching the subject after grading the exam papers to determine their

view of the program and whether they thought blended learning was effective based on the results of the exams.

Duration of Study

The whole project took more than one year to complete. One semester (2/2015) was spent to develop the online content of the course, and another semester (1/2016) was spent to allow the students taking the course to use it.

Participants

The participants were the students taking the subject with online content as supplementary material and the lecturers teaching the course.

Development of the Blended Learning System

The course selected for this purpose was MGT3905, Operations Management, with 13 sections taught by five lecturers and taken by

approximately 500 students in each semester. The reason for selecting this course was the high number of students taking this course and the positive attitude of the lecturers towards blended learning. The researcher and the instructional designer (ID) met with the lecturers to determine the most appropriate online supplementary material. The lecturers were invited to the audio/visual studio to take videos while teaching as they did in their classrooms. It took almost a full semester to produce a total of 12 video lectures to parallel 12 weeks of teaching in classrooms. The team of ID, programmer, graphic/web designer, and video editor worked together to edit the video lectures and mix them with PowerPoint slides to develop an online course on a Moodle based LMS containing video lectures, audio MP3 versions of the lectures, and PowerPoint slide presentations all stored on a server at the Graduate School of eLearning. Figure 1 shows the main menu onscreen after a student logged in to the Moodle site. Students were grouped based on their section number, and each lecturer was assigned to teach several sections.



Fig. 1 List of course on Moodle

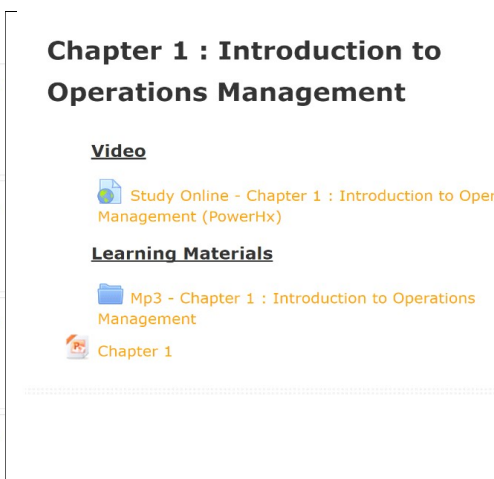


Fig. 2 Menu Options for students

Figure 1 shows the general information displayed onscreen. The options are shown in Figure 2. Students could watch the video lecture and/or listen to an MP3 audio version.

In addition to video and audio lectures, there were PowerPoint slides of the lectures that students could download. There were also online assignments and class forums, which are not shown in this Figure. Class Forums allowed students to interact with each other and/or their lecturers to ask questions. Lecturers could see what students had typed in the Forums and could reply to their comments or questions.

Students could watch video lectures on their laptops or smart mobile devices at any time, which is known as just in time learning (JIT). As shown in Figure 3, students could see the lecturer occasionally, and the PowerPoint slides move forward as the audio or video of the lecturer proceeds. Students could pause, rewind, or go forward as they wish. This feature allowed students to manage their learning anywhere, anytime, at their own pace.

The video lectures were prepared in such a way that the emphasis was on the PowerPoint slides and the audio. Quite often, just the PowerPoint slides were shown with just the audio track of the lecturer explaining the subject matter. This was done to help students to pay more attention to the content rather than just watching the lecturer. Figure 4, shows a screen shot of this part of the video lecture.

Implementation of Blended Learning

In the first week of the first semester of 2016, all lecturers teaching this course alerted their students to the availability of the online lectures with which they could access the course material on demand using their student-IDs and passwords on their laptops or mobile devices. Students were provided with the link to the online course and were encouraged to watch the video lectures if they did not fully understand the lectures in their classrooms. They were also requested to cooperate and answer a survey questionnaire at the end of

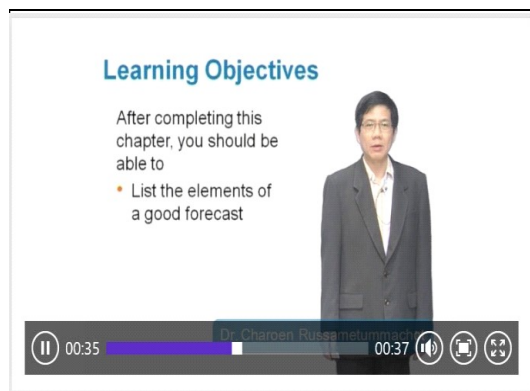


Fig. 3 A screen from a video lecture



Fig 4. Another screen from the video lecture

the semester. Lecturers regularly motivated their students to access the online course site, to do assignments online, watch the video lectures, and post their questions to the forums to be answered online.

At login Moodle software recorded the student-ID, date, time, the activity of the user, and its duration. The accumulating data was regularly monitored to observe the frequency of use and access to the system by students and the Moodle log was saved for further analysis.

Towards the end of the semester students were requested to answer an online questionnaire, which the majority of students did.

After the final exam, three lecturers who had taught most sections of the course were interviewed to ascertain their views on blended learning and their opinions as to its effectiveness in this case based on the exam results.

DATA ANALYSIS

The Online Questionnaire

A total of 323 students responded to the online questionnaire at the end of the first semester of 2016, of which 132 (41%) were male and 191 (59%) were female.

The course was offered to second year students and above who had passed the prerequisite course. The distribution of students based on their year of study is shown in Figure 5. Most students were in their 3rd and 2nd year with a small number of 4th year's.

The students were asked the frequency of access. In all 67 (21%) of students said they accessed the course materials a few times a week, 81 (25%) at least once a week, followed by 79 (25%) a few times a month. It is clear from Figure 6 that about half of the students who responded to the survey accessed the video lectures at least once a week.

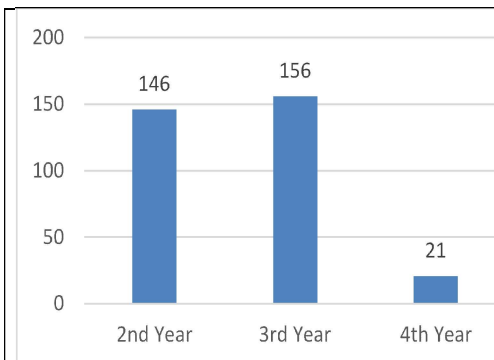


Fig.5 Distribution of students by year of study

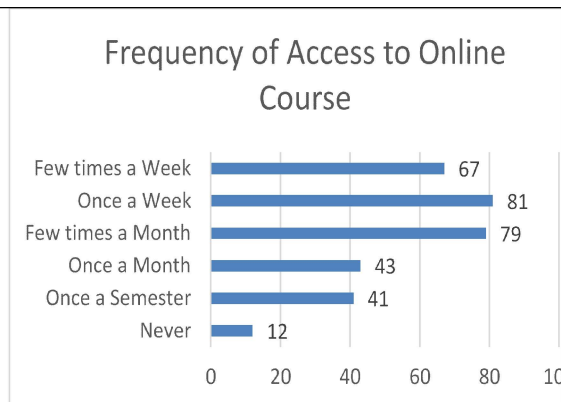


Fig.6 Frequency of Access by Students

Students were then asked to indicate the type of device they had used (Figure 7).

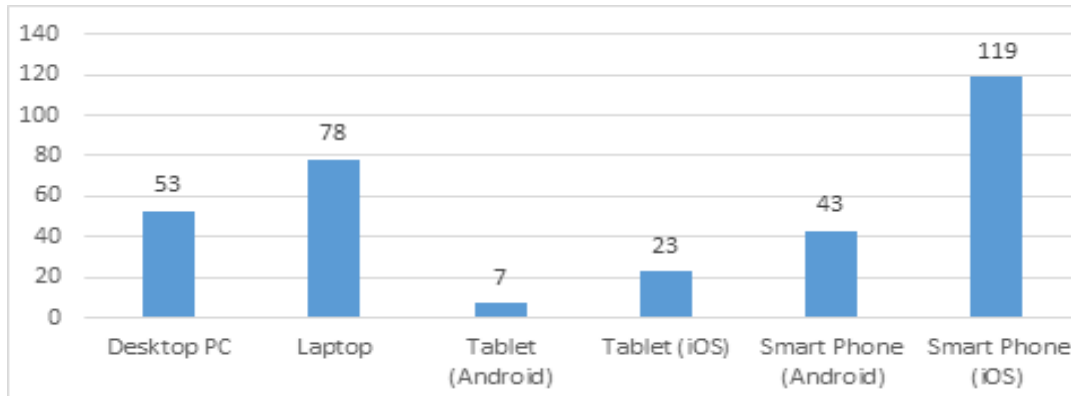


Fig. 7 Type of devices used to watch video lectures

Most students used iPhones (37%), followed by laptops (24%). To ascertain student perceptions about the online course, a series of Likert scale questions were asked to rank from strongly disagree (1) to strongly agree (5). The average response is shown in Table 1 below:

In Table 1, the figure shown is the average score of the 323 students who answered the online questionnaire. It is clear that the average of all students in all questions is very positive, in other words, most students are in agreement with all statements. The question with the highest mark (4.03) was about the

Table 1 Likert scale questions (1-5)

Blended Learning encouraged me to learn better	3.85
Blended Learning in my course increased my interaction with the instructor	3.7
Blended Learning in my course increased my interaction with my classmates	3.5
Blended Learning helped me to study as much as I needed	3.9
Online course helped me to increase study skills for each lesson	3.95
Using Blended Learning took more of my time	3.43
My mobile devices (notebook, tablet, smart phone) helped me in learning	3.95
LMS helped me to be able to study anytime and anywhere	4.03
My computer skills have improved as a result of this course	3.45
I was able to access the online content without any problems	3.73
Overall, I am satisfied with blended learning	4.01

convenience of blended learning which allows students to learn at their own time and place. The second highest (4.01) was the statement on overall satisfaction indicating that most students were satisfied in using blended learning on their mobile devices or laptops. The third highest (3.95) were two statements that indicate that students thought their mobile devices were instrumental in learning online, and that and their study skills improved. The fourth highest score (3.85) represents the perceptions of students that believed blended learning encouraged them to learn better. All these above average scores show that the majority of students had a positive perception of blended learning.

In the survey questionnaire it was asked which features of the LMS students liked the most. Figure 8 depicts the result in percentage terms. The PowerPoint presentations were

liked and used the most. Listening to audio lectures while looking at the PowerPoint slides could be a good option for some students.

To determine students perceptions about the overall effects of the new LMS with the eLearning features, it was asked if the LMS had had any positive impact on their studies and understanding of the subject. Student responses are shown in Figure 9.

The majority of students (78%) believed that the introduction of eLearning into their traditional classroom teachings had very positive impact on their studies and understand of the subject, and 21.5% believed that to a lesser extend it had had a positive impact.

Students were asked if they would like to have the same type of blended learning to be developed for other subjects. Their responses are shown in Figure 10.

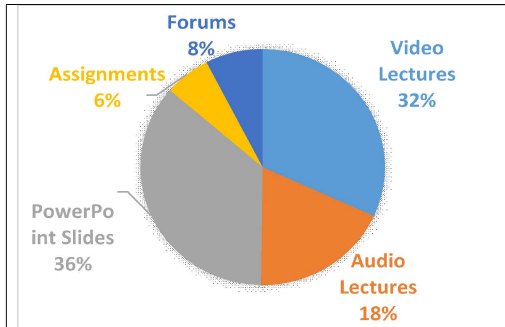


Fig. 8 Features of the LMS liked/used by students

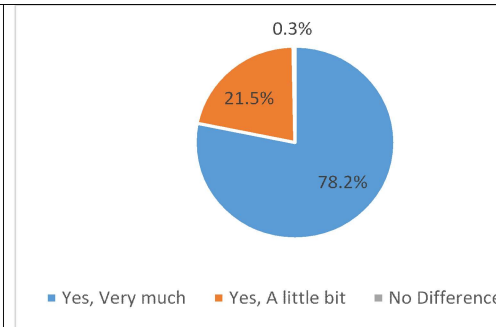


Fig. 9 Impact of Blended Learning on studies



Fig. 10 Students' preference for having blended learning for other subjects

The majority (52%) would like to have blended learning for all subjects, 31% would like to have blended learning for most subjects and 16% for a few subjects. It is evident from Figures 5 and 6 that the majority of students had a positive perception of blended learning in their studies and would prefer to have it for all or most of their subjects.

As shown in Figure 11, the majority of students (52%) replied that they were not willing to pay extra for the online supplement to the course.

Twelve percent replied ‘yes’ with no conditions attached, 7% of respondents answered ‘yes’ on condition that the amount is less than 500 Baht per subject, another 13% replied if the amount is less than 300, and the last 16% were willing to pay if the amount is less than 200 Baht per subject.

The last open-ended question in the questionnaire asked students to suggest improvements and comment on their likes and dislikes. Approximately 15% of students provided comments as very short remarks such as “like it very much” or “helpful” or

“learning on go”. There were some more comprehensive comments such as “thank you for the online course, I could watch the lectures as many times as I needed to understand the topic better”. A few students remarked “we should have blended learning for all courses”, there was also a comment saying “I watched the online lecture when commuting to university in the morning before attending the class, and I could understand the topic better when listening to the lecture in the classroom on the same day”. A few commented that they could learn the subject better as the result. One student suggested “please make the LMS more user-friendly and easy to use”.

Moodle Data

Moodle logs dates, times, and the activity of users at login. This log is quite detailed and contains many pages of daily activities of over 400 students over a period of a semester. The researcher summarized the access to the Moodle System as shown in Figure 12.

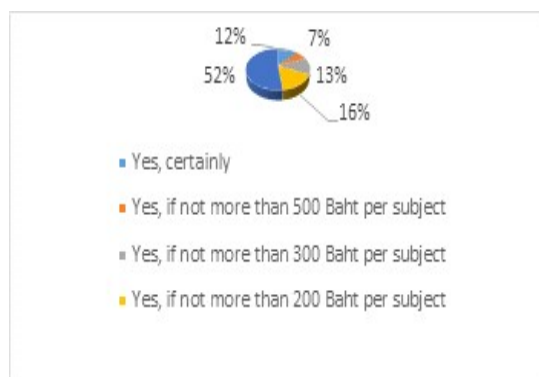


Fig. 11 Students’ willingness to pay for online course

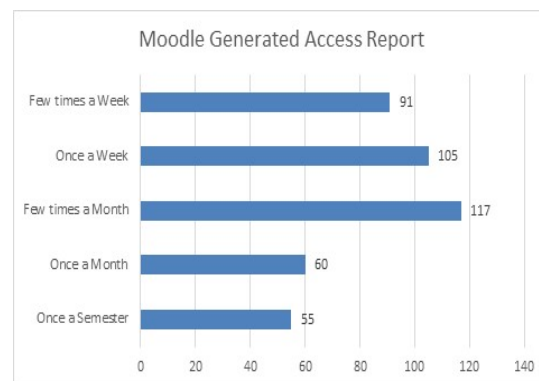


Fig. 12 Summary Moodle Generated Access Report

Figure 12 should be compared with Figure 6. The summary report generated by Moodle shows higher access to the Moodle System than that reported by students. The reason could be that some students used the online course but did not participate in answering the questionnaire. Another reason could be occasionally some students might have logged in to system but did not finish watching a video lecture.

The Lecturers' Interview

Three of the lecturers teaching this course were interviewed after two consecutive semesters of teaching this course using blended learning as a supplement to their classroom lectures and observing the performance and results of the students. The first question put to them was if they thought the online course helped students to understand the subject matter better. All 3 lecturers replied "yes", they believed so. And reported that they had constantly encouraged their students to watch the video lectures again at their own pace if they could not fully understand their lectures in the classrooms. The second question was if the students performed better in their mid-term and final exams during the past two semesters compared to previous semesters. Here again all three lecturers replied "yes, certainly better". They all confirmed that they were still using the online courseware and continued to encourage their students to watch it even though there was no more data collection and analysis. The last question put to the lectures was if the average score of mid-term and final exams of students increased, decreased, or remained the same during the past two semesters compared to previous semesters. Here also, all three lecturers replied that the

average of exam scores had increased, though they were not certain by what percent the average grade point average of the class increased. All three lecturers confirmed that they would continue using the online materials as they observed positive results in exam scores and student.

CONCLUSIONS

Blended learning was in this case believed to be effective in enhancing and improving learning. Based on replies to the questionnaire, 78% of students believed that it had a strong positive impact on their studies, and another 21% indicated a lower level of positive impact. In answer to another question, 83% of students wanted to have blended learning features added to some or all their other subjects.

Students were satisfied with using the online course as a supplement to their classroom lectures. In a Likert scale of 1 to 5, when asked their overall satisfaction with the using the blended learning features for their course, the average of all the students in all sections taking the course was 4.01 which shows a high level of satisfaction.

In a future study it is recommended that student identities and abilities be matched against the number of times they watched the online video lectures to obtain more detailed data on the possible improvement in exam results as a function of frequency of access.

IMPLICATIONS AND RECOMMENDATIONS

Thai government policy "Thailand 4.0" and its component "Education 4.0" is one way to improve the quality of education in Thailand though it requires more effort and attention from

lecturers and administrators of universities. It is a costly procedure to develop an online course. It requires additional work by lecturers and instructional designers and a technology team to develop a course for blended eLearning purposes. To determine whether students were willing to pay extra for a course to have an online version as the supplement, they were asked if they were willing to pay extra in addition to the tuition fee to have an online version.

Following this study, it is expected that blended learning could improve student understanding in all subjects, depending on their commitment and use of the online materials, remembering that lecturers play an important role in motivating and engaging students. To develop successful blended learning requires commitment from the lecturers who must put in time and effort with assistance from ID's and IT staff. We recommend that university management allocate budget to develop more online courseware to supplement existing lectures.

Students could be charged an extra amount per subject for the blended learning option of a course. The extra amount collected from students could be used to compensate lecturers and the development team to produce more online and blended learning courses. A blended learning course could on average be used for three to five years before changes in course material or the introduction of a new edition of the textbook would require the process to be repeated.

Finally, students will be the main beneficiaries of online courses that improve understanding and with that, the quality of university graduates.

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