

A COMPARISON STUDY OF CONVENTIONAL AND BLENDED LEARNING ON TECHNICAL COURSE PERFORMANCE

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ABSTRACT

The introduction of blended learning is so remarkable that almost any learning institution takes it as a lifesa ver. By integrating conventional face-to-face teaching with technology-based learning, blended learning can help students who are now technology-driven besides increasing teacher-student engagement and improving students' performances. The research was carried out to evaluate a significant difference in performance between students who had gone through a conventional learning approach and students who had learnt through blended learning. The performances were measured based on the courses selected from Bachelor of Engineering Technology in Naval Architecture and Shipbuilding program, offered in University Kuala Lumpur Malaysian Institute of Marine Engineering Technology (UniKL MIMET). Two different cohorts of students had been selected for the comparison purposes, and average scores from specifically five (5) technical courses in practice were analysed. Average students' scores from the January 2012 cohort were selected and were compared to a verage students' scores from the January 2015 cohort, where blended learning came into practice. The results obtained shows that both cohorts of students displayed an almost similar trend of performance. Using the survey results, how the students' motivation and distraction impacted the overall performance were also explained.

Keywords: blended learning, e-learning, performance, internet

INTRODUCTION

The internet has created many opportunities for many different people in many ways. It is the most useful technology of modern times that played its major role in almost every sector, which education is not to be excluded. The most common thought of using the internet among teenagers or students is to socialise and entertain. Meeting the diverse requirements of students is such a crucial task as an educator. However, since the introduction of online learning, the academic sector has changed tremendously. The internet becomes such a powerful learning tool, especially the 'World Wide Web', where information on just about anything is just a click away. It is not only beneficial to learners; teachers also have access to more information from what they previously obtained from books or printed materials. There are various academic reasons for using the internet; thus, it is important to consider to what extent students in higher education use it to improve their learning experience. Technology, in history, has been used in education for many years, yet, it becomes more widespread when the internet finally penetrates extensively to many countries and the term 'Blended Learning' came to picture, where it means a combination of classroom instruction and the use of the internet.

University Kuala Lumpur implemented Virtual Learning Environment (VLE) in 2010 and was fully implemented since 2015. Although VLE was not easily accepted by the lecturers due to its functionality and reliability, with the integration of face-to-face teaching and technology-based learning, it has remarkably helped improve teaching and learning processes. The benefits of blended learning are greater for the students as they can easily access lecture notes online or through videos uploaded by the lecturers to improve their understanding. Students are also assessed online, to some extent that they can do their tests or quizzes anywhere provided that they have good Internet

connectivity. Furthermore, the interaction between the lecturers and students can also be improved, through the chat or forum function in the VLE page, which means learning does not stop when the lesson ends.

With the explanations mentioned above, it is crucial to evaluate how the students perform academically after blended learning has taken place. It is also beneficial to see whether conventional face-to-face classroom instruction is still relevant to the students. For the reasons mentioned above, this study aims to look at the students' academic performances who went through conventional classroom instruction and those who had experienced blended learning. This research also provides a direct comparison of average scores from five (5) technical courses to investigate whether blended learning can replace the existing learning method.

LITERATURE REVIEW

Electronic learning, also called electronic educational technology, is an advanced education approach that mostly applies to teaching and learning activity. Currently, the terminology is being abbreviated and well accepted as e-learning. According to Dondorf (2016), E-learning approach has become important and significantly applied for many years. The approach mainly prioritises the computer-based learning system to provide students and lecturers with benefits in terms of venue flexibility, time, and pace [1]. Besides, E-learning offers variety and interactive ways of communication and motivation. Hence, higher education institutions need to play their role in facilitating access to these virtual courses for E-learning approach [2]. However, E-Learning implementation's success is influenced by many factors, including learning and cost-effectiveness, institutional commitment, accessibility, faculty, and student satisfaction [3]. Thus, the student's assessment can be more efficient and effective by considering the E-learning implementation factors. The Jeswar (2015) added that technology tools used to deliver knowledge would also determine the E-learning implementation's success. More flexible and comfort tools such as iPad and electronic notebook can help support the educational E-learning system [4].

Many studies were conducted on the comparison between the conventional and electronic learning approach. However, the results produced a mixed variety of findings. Rivera and McAlister [5], in 2001 compared the efficacy of three different class approaches; 1) a conventional lecture, 2) a web-based learning and 3) hybrid format, which used a mix of traditional and web-based materials. A statistical analysis of the exam results was conducted on 134 students and showed no significant difference between them. Another study was made by Zhang et al. in 2005 [6] highlights that the conventional classroom teaching with an interactive e-learning platform, containing videos of the lecture, presentation slides and lecture modes. The experiments were made on 104 learners to evaluate the system's effectiveness and the learner's performance. The results indicated that the students who utilised e-learning were significantly higher than the classroom learners' scores. In the post-study questionnaires, most e-learning groups reported that they liked the multimedia presentations and were satisfied with the flexible learning process. Another study was made by Lim et al. in 2008 [7] where they investigated the effects of three different methods of teaching: 1) online instruction, 2) traditional face-to-face, and 3) a combination of both. One hundred fifty-three students' performances and satisfaction levels were measured during the experiment. The study results showed that students in the online learning group and the combined learning group had statistically significant higher achievement levels than students in the traditional learning group.

The literature with regards to e-learning and its effectiveness is somewhat contradictory. Multiple studies claimed that online platforms benefit the learners, as well as studies that showed the opposite. Ungerleider and Bums [8] analysed multiple of these studies in 2003. In total, they found 135 studies that claimed to measure the effects of online learning compared to traditional classroom learning. According to the team, most of the studies were methodologically flawed. Some of the problems found were missing random assignments of learners, missing control groups, lack of experiment control, and small sample sizes. When comparing E-Learning to traditional learning, some researchers rated E-Learning as more effective than traditional learning. However, some rejected it with less social interaction, high-cost investment, and technical problems in communication and computing technology.

Suresh in 2018 suggested broadening the concepts of e-learning in providing more opportunities to the teachers and the learners to improve their knowledge. Ensuring the technology tools used aligned will certainly inculcate interest in academics, especially the youngsters [9]. Since this particular study focuses on E-learning implementation on technical subjects, finding their performance and achievement can be discovered and discussed.

MATERIALS AND METHOD

This research was conducted based on two different cohorts of students enrolled in the Universiti Kuala Lumpur Malaysian Institute of Marine Engineering Technology (UniKL MIMET) and pursued their Bachelor of Engineering Technology in Naval Architecture and Shipbuilding program. For comparison, cohorts of students registered in January 2012 and January 2015 were selected, and their average scores of five (5) technical courses were calculated. Students from January 2015 cohort and onwards were the students who practised blended learning in their studies. The five technical courses are as follows:

1. Ship Design
2. Numerical Method
3. Introduction to Programming
4. Marine System Design
5. Introduction to MATLAB

All five technical course data were selected from September 2014 to January 2019 semesters. These courses are 100% practical courses that do not have a final examination. All courses have similar marks distribution, as shown in Table 1.

Table 1: Marks distribution for 100% practical courses

| Assessment | Marks Distribution (%) |
|------------------|------------------------|
| Mini Project | 30 |
| Practical Test | 50 |
| Technical Report | 20 |
| Total | 100 |

For accuracy, the below criteria are followed:

1. The minimum number of students per class for each course must be more than 15 students for average marks calculation.
2. Students with low marks due to poor attendance (bar status) and failing to submit tasks were ignored in average marks calculation.

From the above criteria, average marks were calculated for each class and average marks were recorded for ten consecutive semesters. Average and marks evaluation were based on data provided in Table 2. All data acquired from The Academic Management Department (AcMD) of the Universiti Kuala Lumpur Malaysian Institute of Marine Engineering Technology.

Table 2: Courses and semesters are taken for comparison and average marks calculation

| Courses | Semesters | Blended learning |
|-----------------------------|------------------|-------------------------|
| Ship Design | September 2014 | No |
| | January 2015 | Yes |
| | September 2015 | Yes |
| | January 2016 | Yes |
| | September 2016 | Yes |
| | January 2017 | Yes |
| | July 2017 | Yes |
| | January 2018 | Yes |
| | July 2018 | Yes |
| | January 2019 | Yes |
| Numerical Method | September 2014 | No |
| | January 2015 | Yes |
| | September 2015 | Yes |
| | January 2016 | Yes |
| | September 2016 | Yes |
| | January 2017 | Yes |
| | July 2017 | Yes |
| | January 2018 | Yes |
| | July 2018 | Yes |
| | January 2019 | Yes |
| Introduction to Programming | September 2014 | No |
| | January 2015 | Yes |
| | September 2015 | Yes |
| | January 2016 | Yes |
| | September 2016 | Yes |
| | January 2017 | Yes |
| | July 2017 | Yes |
| | January 2018 | Yes |
| | July 2018 | Yes |
| | January 2019 | Yes |
| Marine System Design | September 2014 | No |
| | January 2015 | Yes |
| | September 2015 | Yes |
| | January 2016 | Yes |
| | September 2016 | Yes |
| | January 2017 | Yes |
| | July 2017 | Yes |
| | January 2018 | Yes |
| | July 2018 | Yes |
| | January 2019 | Yes |
| Introduction to MATLAB | September 2014 | No |
| | January 2015 | Yes |
| | September 2015 | Yes |
| | January 2016 | Yes |
| | September 2016 | Yes |
| | January 2017 | Yes |
| | July 2017 | Yes |
| | January 2018 | Yes |
| | July 2018 | Yes |
| | January 2019 | Yes |

RESULTS AND DISCUSSION

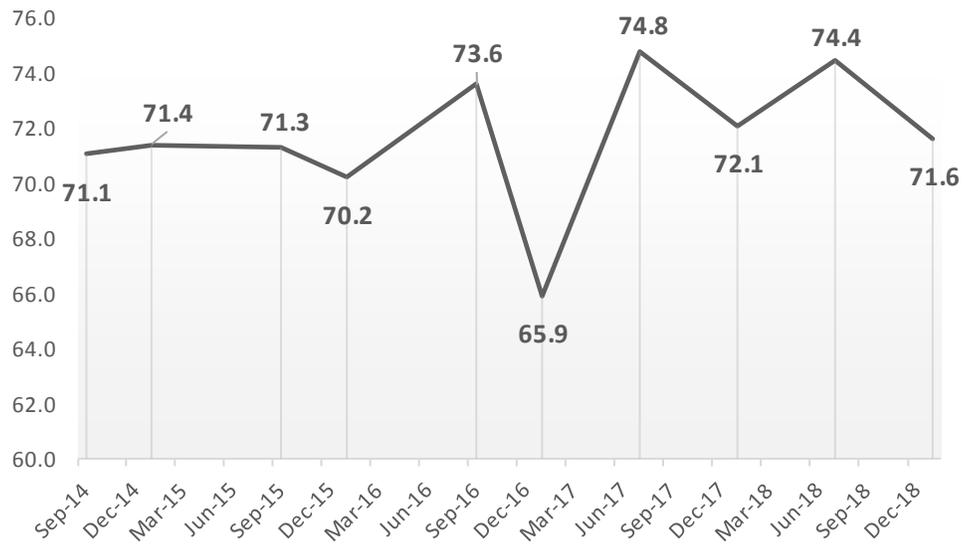


Figure 1: Average Scores for Ship Design

Figure 1 shows the average score for Ship Design in ten consecutive semesters, from September 2014 to January 2019. The average score had increased by about 1% after VLE implementation compared to the results before using VLE. Although there was a decrease in a verage score for January 2017, the number increased a gain in the next semester, where the highest score was recorded amongst all ten semesters.

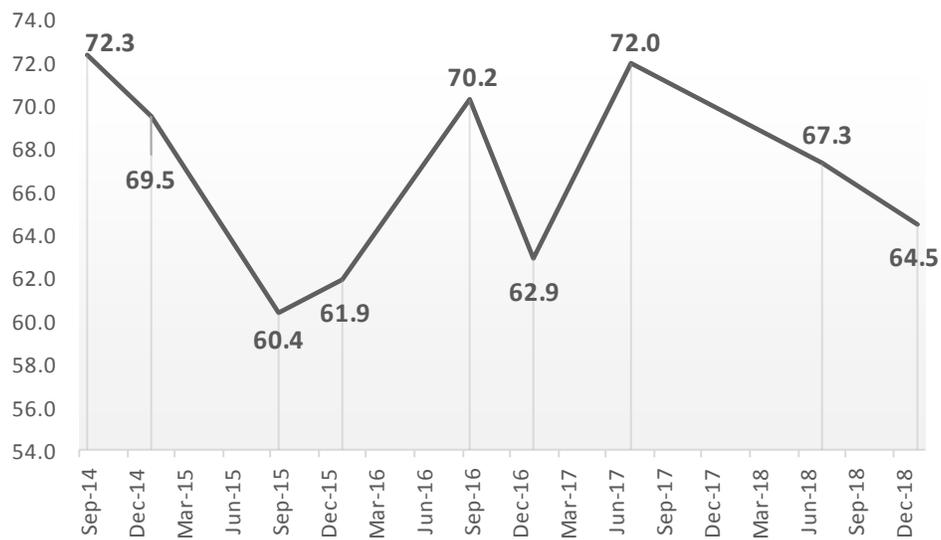


Figure 2: Average Scores for Numerical Method

Figure 2 shows the Numerical Method's average score in ten consecutive semesters, from September 2014 to January 2019. With the introduction of VLE, the average score increased by about 1% compared to the results before VLE usage. However, there was a slight decrease in a verage marks for January 2017; the average increase sharply in the next semester and achieved the best result among the ten semesters.

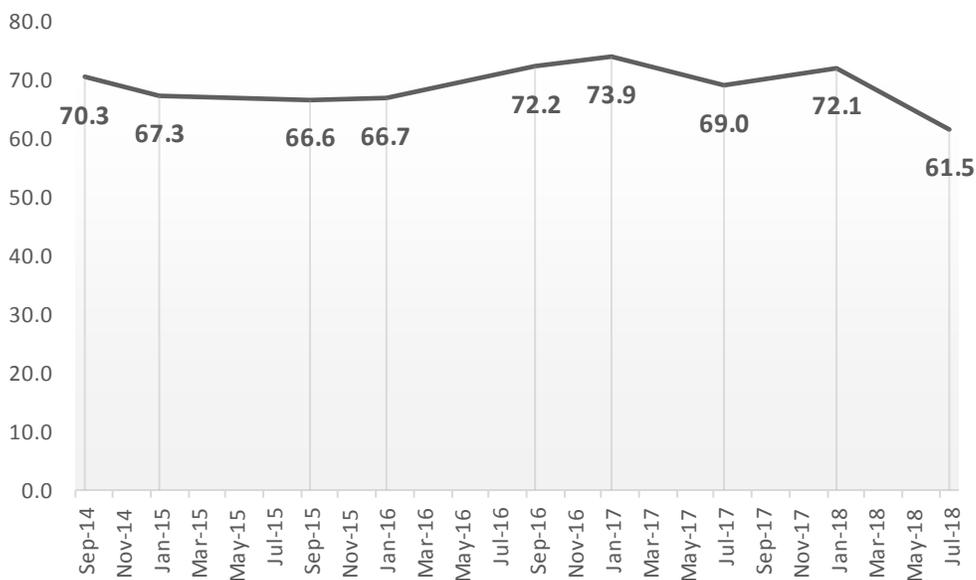


Figure 3: Average Scores for Introduction to Programming

Figure 3 shows the average score in ten consecutive semesters for Introduction to Programming from September 2014 to January 2019. With the introduction of VLE, the average score increased by about 1% compared to the results before VLE usage. Although there was a small decrease in average marks for July 2018, the results can be ignored because only two students took that subject that semester compared to the other semesters.

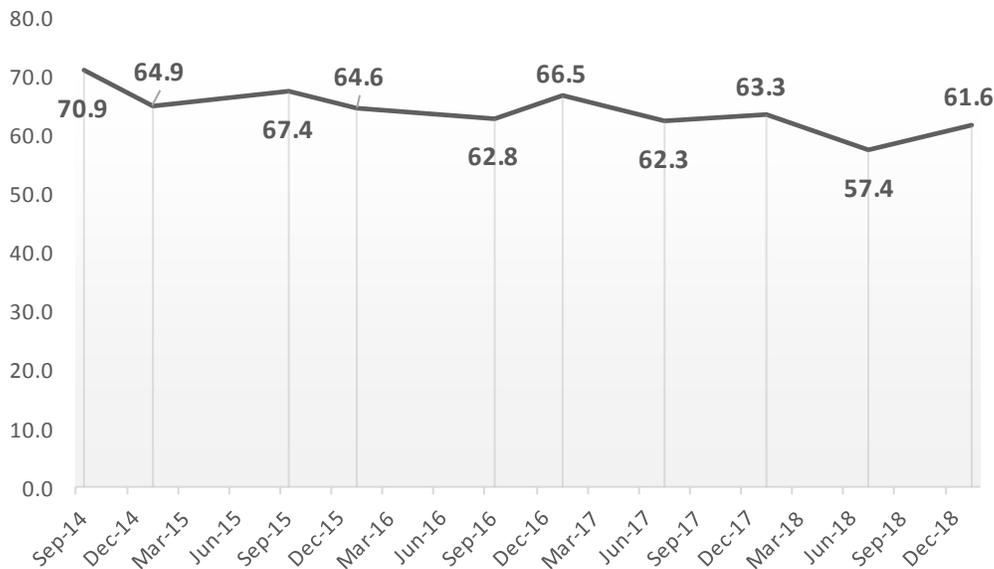


Figure 4: Average Scores for Marine System Design

Figure 4 shows the average score in ten consecutive semesters for Marine System Design from September 2014 to January 2019. With the introduction of VLE, the average score decreased by about 1% compared to the results before VLE.

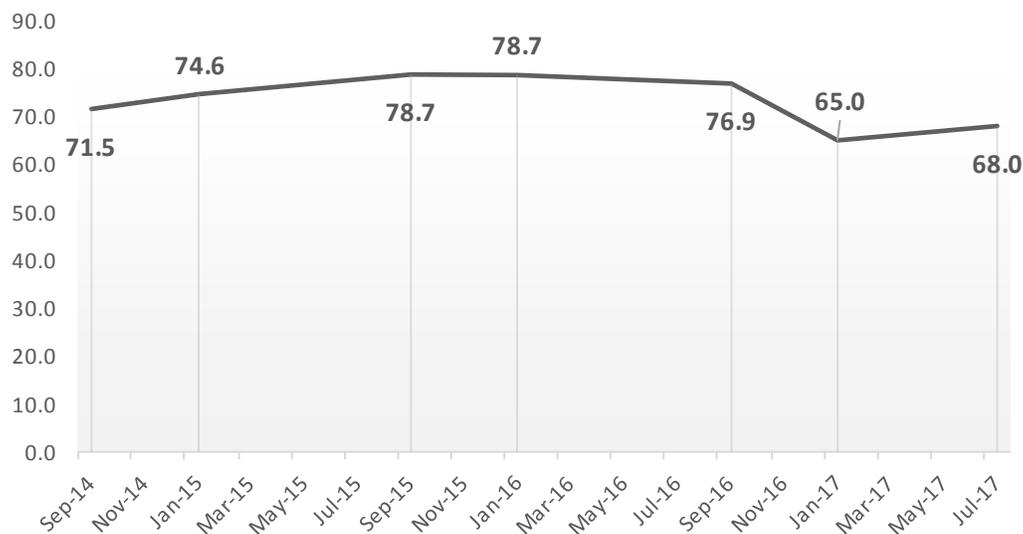


Figure 5: Average Scores for Introduction to MATLAB

Figure 5 shows the average score in ten consecutive semesters for Introduction to MATLAB from September 2014 to January 2019. With the introduction of VLE, the average score decreased by about 1% compared to the results before VLE usage.

The results obtained showed a significant effect on implementing the Virtual Learning Environment (VLE) for the five courses was not seen. Three of the five courses, Ship Design, Numerical Methods and Introduction to Programming, had shown a slight increase in average scores. However, the other two courses, Marine System Design and Introduction to MATLAB, had recorded a slight decrease after the implementation of VLE. The idea of measuring the scores from these practical courses upon applying the new edge teaching and learning medium was to investigate whether this education platform presents a very significant improvement, yet, it was discovered that it was not evident. Although the desired results were not acquired, the implementation of VLE had led to a few positive impacts on the teaching and learning process.

Since the introduction of VLE as a new platform of teaching, the institution has taken the challenges positively and aggressively. A considerable amount of allocation on facilities to support this idea has been allocated by UniKL Management. RM10 million is approximately allocated in the facilities and equipment upgrading to cater to the rise of computer and internet usage since the year 2015. These are the essential tools to utilise VLE. The institution received about 100 new personal computers, upgraded speed of Internet lines and servers, and additional teaching aid equipment such as digital web cameras and digital smartboards.

UniKL Management has fully exhibited their support on the usage of VLE and has acknowledged their interest by placing it as part of their Key Performance Indicators. With this initiative, the use of VLE as a teaching and learning tool has increased significantly, with more than 85 percent of lecturers actively delivering their teaching through this medium in 2018. It is such a massive increment in VLE usage as compared to the years before. This escalation is supported by the massive rise in teaching videos to assist lessons through this platform. In 2018, about 180 videos were uploaded in VLE, which had displayed strong interest by lecturers as this alternative offers many advantages to them and of course, to the students. With the current online-everything trend, students will appreciate learning more when it becomes handy and easily accessible.

CONCLUSION AND RECOMMENDATION

The present study evaluated whether there is a significant difference in performance between students who had gone through the conventional learning approach and students who had learned through blended learning. In the context of UniKL MIMET, one of the leading TVET institutes in Malaysia, based on the current results, the development and the implementation of VLE are here to stay. Although the displayed results from this research on the ten semesters did not show a significant effect on the implementation of VLE, the current study and other related studies have shown that VLE has great potential to continuously improve the teaching and learning processes and also the facilities of its premises. Specifically, the results that were analysed in this study show that this teaching technique provides a few advantages such as the huge impact on the development of campus facilities to support its implementation, the increase on teachers involvement in Internet-based teaching, high growth in teaching aid and material posted which eventually will help students in their study. Furthermore, it has shown a drop in the number of absentees, reflecting in the increment rate of Graduate on Time (GoT) percentages. Overall, it can be concluded that VLE is a way forward. Although the impact is not noticeable, the implementation and development will provide UniKL with many benefits.

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