Improving student learning achievement in the block of nervous system and special senses through application of blended learning strategy

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Abstract. Since its establishment in 2009, the Faculty of Medicine and Health Sciences, University of Warmadewa has implemented a competency-based curriculum, in which teaching materials are grouped into block based on systems or themes. By this way, learning is expected to be more meaningful because clinical sciences can be introduced to student earlier. The study design was cross-sectional analytic where all students of the years 2016 and 2017 who underwent block 1.6 (Nervous System and Special Senses) were involved. From the present study we concluded that E-learning in combination with conventional learning method (blended learning) increased student achievement in final students assessment of the block Nervous System and Special Senses, hence E-learning can be applied as a supporting tool for conventional learning method.

1. Introduction

Medical education at Warmadewa University consists of two continuous phases, namely: academic (8 semesters) and professional phase (4 semesters). Since its establishment in 2009, the Faculty of Medicine and Health Sciences, University of Warmadewa has implemented a competency-based curriculum, in which teaching materials are grouped into block based on systems or themes. By this way, learning is expected to be more meaningful because clinical sciences can be introduced to student earlier. Conventionally, teaching learning process was undertaken face to face with Problem-Based Learning (PBL) as a learning strategy, supported by tutorial, interactive lecturing, small group discussion, individual learning, student project, community learning, and practical class as a learning method.

There are 32 blocks in the academic phase where 4 blocks are included in the first semester, 4 blocks in the second semester, 4 blocks in the third semester, 4 blocks in the fourth semester, 5 blocks in the fifth semester, 4 blocks in the sixth semester, 4 blocks in the seventh semester, and 3 blocks in the eighth semester. Among the 32 blocks, one block is titled “Nervous System and Special Senses”, which is placed in the second semester besides the block “Muscle and Bone System”, “Cardiovascular System”, and “Respiratory System”. According to many of the students, the block Nervous System and Special Senses has a high degree of difficulty due to complexity of the system. This was proven by the result of the block’s final examination where in the year 2016 the average students’ score was 41.98, 49.32, and 54.29 of the blocks Nervous System and Special Senses, Cardiovascular System, and Respiratory System, respectively.
Meanwhile, the fast progress of science and technology, especially information and communication technology characterized by the fast growth of internet technology has brought rapid change in all aspects of life including the field of higher education. Currently, E-learning is one of the internet-based learning technologies that has been introduced and used by many countries in the world and its popularity increases from year to year due to its following benefits: cost efficient, flexible, effective, and ability to promote individual learning capacity. Besides that, E-learning also make it easier for students to absorb learning material [1]. Santi Maudiarti stated that student acceptance on blended learning was high [2]. 98% of all companies plan to use E-learning by 2020 to provide opportunities for small businesses [3]. In the era of innovation disruption, Higher Education Institution is targeted to implementing teaching learning activities in accordance with the fast growth of technological developments and therefore must be balanced by improvement of human resources capacity [4]. Furthermore, the Minister also said that E-learning has been practiced in some universities in Indonesia, and in the next future more universities will use this method. In fact, E-learning has been used increasingly year by year. It is believed that application of E-learning can strengthen effectiveness of the conventional learning method which by itself has not been able to lift student understanding optimally.

This present study aims to analyse the outcome of conventional learning method in combination with E-learning (blended learning) in improving student achievement in the block Nervous System and Special Senses.

2. Methods

The study design was cross-sectional analytic where all students of the years 2016 and 2017 who underwent block 1.6 (Nervous System and Special Senses) were involved. The total number of students was 80 (31 males and 49 females) and 92 (39 males and 53 females) of year 2016 and 2017, respectively. The students of 2016 were exposed to conventional learning method, while the students of the year 2017 were exposed to blended learning method (combination of conventional and E-learning). The duration of the course of each year was 5 weeks.

The process of forming E-learning material began with the development of material tailored to the syllabus with the help of students. Before the material can be uploaded, it must be validated and agreed by the experts. Such E-learning material included practicing answering exam questions and try-out of block exam. At the end of the block activity, students underwent a block exam in which the test material consisted of 100 multiple choice questions in accordance with national standards. Statistical analysis of Kosmogorov Smirnov was used to test the normality of the data and Independent student t-test was used to analyse the difference between the two groups.

3. Results

Kosmogorov and Smirnov test indicated the normality of data distribution, while independent student t-test showed the following: average score of final block exam achieved by students of the year 2016 was 46.81 in males and 42.35 in females (p = 0.071), while for the students of 2017 the average score in males was 50.15 and in females was 52.62 (p = 0.280). The average score gained by male students of the year 2017 was found to be higher compared to male students of the year 2016, however this difference was not statistically significant (p = 0.216). In the case of female students, it was found that average score achieved by female students of the year 2017 was also higher compared to female students of the year 2016 and it was proven to be statistically significant (p = 0.00). Overall, it was found that average exam scores of students are as followed: 44.08 in students of the year 2016 (deviation standard 10.78) and 51.58 in the students of year 2017 (deviation standard 0.80). The difference was 7.50 (p = 0.00) and this is statistically highly significant. The effect size of the two groups was 0.696.

4. Results and discussion

Ruiz et al stated that E-learning was appropriate to use as supporting system to conventional learning method but not to replace the existing system. In the Faculty of Medicine, University of Warmadewa
the use of E-learning is intended to improve the effectiveness of conventional learning method mainly on the field with high level of difficulty, such as the block of Nervous System and Special Senses [5]. In an experimental study conducted by Yien et al, it was found higher learning outcomes for students using game-based learning compared to students who did not use it [6]. Systematic review studies and meta-analysis conducted on nursing students revealed that smartphone based mobile learning has a positive impact on learning knowledge, skills, and attitudes (3). According to the perception of Indonesian students, E-learning is a learning technology that is easily accessible through website, attractive displays with combination of colours, and interesting with the presence of learning image and videos [7]. However, a study done by Gurpinar et al found that outcomes of the conventional learning method was not different compared with the outcomes of online learning method [8].

5. Conclusion
From the present study we concluded that E-learning in combination with conventional learning method (blended learning) increased student achievement in final students assessment of the block Nervous System and Special Senses, hence E-learning can be applied as a supporting tool for conventional learning method.

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