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Pjbl Mooc: A New Learning Model In Web Programming

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Abstract

This study aimed to develop the MOOC PjBL Model in web programming learn-ing to improve student understanding and student learning outcomes. The exper-imental researchmethod is closely related to R&D. The research subjects consist-ed of 48 students of the Informatics Management study program, Faculty of Sci-ence and Technology, University of Labuhanbatu, Indonesia. The Independent Sample T-Test results show that the post-test results inthe control class at the student's ability level are less than optimal because they have not been treated. At the same time, the t-test results obtained a very significant difference in the final resultsof students in the control class of 67.92 as well as the experimental class of 85.33. The results fromthe control and experimental classes showed an in-crease in higher learning outcomes in the practical course. This certainly illus-trates that the developed model can be applied in universities to improve skills in learning web programming.

Keywords: E-Learning, MOOC, PjBL, Pretest, Posttest,Web Programming

INTRODUCTION

The development of Information Technology (IT) is growing rapidly (Hamdan, 2018), theneed for an IT-based teaching and learning concept and system is undeniable (Sundari, 2019), resulting in an idea which is then known as e-learning which has an influence on the migration process of conventional education to the digital system (Andy Kurniawan et al., 2019), both in terms of content or the system.

E-learning has been in existence for a while and accepted globally as indicated by its application in institutions of learning and multinational companies such as those issued by Cisco Systems, Microsoft Corporation, and so on as a learning tool or just as a service. Educational institutions to students and industry to consumers or employees (Nidhom et al., n.d.).

E-learning is defined as an internet application designed to ensure students and their educators are connected in a virtual learning environment created through the internet. It was established to subdue the problems of learning associated with space, time, conditions, and circumstances (Asri et al., 2016). The use of e-learning is not new anymore or what we know as open-source, open-source e-learning that can be used are Moodle, ATutor, Dokeos, Claroline, Chamilo, Efron, and many more. E-learning has various types, including learning management systems or often abbreviated as LMS (moodle, Camilo, front), e-learning service providers (classes, quipper school, google classroom, and Edmodo) as well as website development through frameworks and coding. Most school educational institutions use LMS-type e-learning as a medium or container to assist learning.

The application of the e-learning concept in education institutions is expected to serve as a complementary function towards overcoming the problems associated with learning by allowing the teachers to make available the resources required by the students to understand the subject being

taught without having physical contact (Mohd Erfy Ismail, Pipit Utami, Irwan Mahazir Ismail, Norhasyimah Hamzah, 2018).

Learning either face-to-face, non-face-to-face (e-learning), or a combination of both, is a process that involves three interrelated activities, including (1) presentation activities, namely exposure or presentation of learning materials, (2) interaction activities, namely reciprocal communication activities between facilitators and learners as well as between learners, and (3) evaluation activities that serve as a measure of progress and learning success (Biologi, 2015), with e-learning students are also not worried about the loss of material learning files due to e-learning.

-learning here is web-based, so the data that has been uploaded in e-learning is not lost (Wardani, Toenlioe, 2018).

In line with current technological developments, many studies suggest that there is a need for development in distance education (Fandianta et al., 2013) (Hardi et al., 2018). MOOC was first introduced in Indonesia in 2006 and emerged as a popular learning mode in 2012 (Ibrahim et al., 2021). Moreover, another innovative approach (Mohd Erfy Ismail, Pipit Utami, Irwan Mahazir Ismail, Norhasyimah Hamzah, 2018) (Mohd Erfy Ismail, Pipit Utami, Irwan Mahazir Ismail, Norhasyimah Hamzah, 2018) which involves delivering learning materials through the internet was introduced in several institutions of learning throughout the world (Suyetno & Solichin, 2020) and this created a revolution with the people observed to be implementing the system to ensure sustainable learning and teaching processes (Husna, 2019).

LITERATURE REVIEW

PJBL

The Project-Based Learning (PjBL) model is a project-based learning model(Ratnasari et al., 2018). Through the PjBL learning model, a project will be designed from which a product will be produced (Jalinus et al., 2017) so that students have the space to pour out creative and innovativeideas by trying new things through the projects they do (Giatman et al., 2019)(Subandi et al., 2021).For this reason, students are required to be more active, and the teacher acts as a facilitator (Juwantiet al., 2020).

MOOC

Massive Open Online Course (MOOC) is an online learning system through a wide and open network (Johan, 2016), with the aim of enabling unlimited participation and can be accessedvia the Web or mobile smartphone (Rengganis et al., 2018), with various methods and platforms (Sukriono & Sudirman, 2020)(Febrian et al., 2021).

RESEARCH METHOD

The experimental research method is a method that is closely related to R&D be-cause it is an accurate method to prove the success of R&D (Krismadinata & Susanti, 2021). This involvedthe random selectin of two groups after which a pretest was conducted to determine the initial stateto differentiate between the control and the experimental group, by ap-plying the PjBL MOOC model. It consists of 48 students of the Informatics Man-agement study program, July–December2021, at the Faculty of Science and Tech-nology, University of Labuhanbatu, Indonesia.

This study divided the group into 2, the test group n = 24 people the control group n = 24 people. The control class is needed as a comparison of learning outcomes against classes using the PjBL MOOC model that has been developed. The control class in this study includes the class with the old/conventional model and the class that uses the PjBL MOOC model before the step-by-step development.

RESULT AND DISCUSSION

Cognitive Test

The cognitive aspect aims to assess the extent of student mastery of theoretical studies in web programming courses. The results of the pretest and posttest cognitive aspects of the control and experimental classes.

Table 1. COGNITIVE ASPECT TEST RESULTS			
Class	N	Mean Pre-test	Mean Post-test
Experiment	24	49,75	85,33
Control	24	53,58	67,92

The graph of the pre-test score is as follows:

Figure. 2

Figure. 3

Post-Test Homogeneity Test

The cognitive aspect aims to assess the extent of student mastery of theoretical studies in web programming courses. The pretest and posttest results for the cognitive aspects of the control and experimental classes and the results of the homogeneity test with spss, obtained the results of Signification(Sig). The mean value calculated to be 0.222 > 0.05 show a similarity or homogeneity in control group's variance and the experimental group' post-test as indicated in the following Table 2.

Table 2 POST-TEST HOMOGENEITY TEST				
	Levene Statistic	df1	Df2	Sig.
Post-test	1.535	1	46	0.222

Thus, one of the requirements (not absolute) of the independent sample t-test can be met. In addition to the homogeneity of the data, there are other requirements in using the independent sample t-test where the conditions (absolute) data must be normally distributed through the normality test.

Post-Test Normality Test

The normality test was conducted through the application of Kolmogorov Smirnov statistics at 0.05 significance level using SPSS and the results obtained are presented in Table 3.

From the SPSS results above, it can be stated that the results of normality in the Kolmogorov-Smirnova test obtained a post-test value in the control class of 0.893 and the post- test results in the treatment class of 0.557> 0.05, the data concluded normally.

Table 3. POST-TEST NORMALITY TEST		
	Experiment	Control
N	24	24
Normal Parameter[a,b]Mean	85.333	67.916
Std. DeviationMost Extreme	3.370	4.548
Differences Absolute	0.162	0.118
PossitiveNegative	0.130	0.115
Kolmogorov-Smirnov Z	-.062	-0.118
Asymp. Sig. (2-tailed)	0.792	0.577
	0.557	0.893

Test Independent Sample T-Test

The implementation of the t-test can be done after the normality and homogeneity tests arecarried out. The t-test aims to see if there is a difference between the two classes. The hypothesesproposed for this test are:

Ho: The control and experimental class students have no difference in the average pretest results.

Ha: The control and experimental class students have a difference in the average pretest results.

Decision-making basis:

Ho is accepted and Ha is rejected when the significance value or sig. (2-tailed) > 0.05.

Ho is rejected and Ha is accepted when the significance value or sig. (2-tailed) < 0.05.

To find out that the developed model is better than the control and experimental classes, the Independent Sample T-Test was carried out. The results are shown in table 4 below.

Tabel 4.
INDEPENDENT SAMPLE T-TEST

	Levene's Test for Equality off Variances		t-test for Equality of Means					95 % Confidence Interval of the Difference	
		ig.		f	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Posttest Equal variances assumed	.535	.222	5.071	6	0.000	17.41667	1.15562	15.09053	19.74280
Equal variances not assumed					0.000	17.41667	15562	5.08521	19.74813

In table 4, the Sig column shows the P-value (P-value) = 0.22. Thus, at the significance level =0.05, receiving Ho, it is concluded that there is a significant difference in average income.

CONCLUSION

Based on the results of research from two classes, namely the control class and the experimental class, there is an increase in learning outcomes that are higher in the experimental class. It is concluded that the learning model developed can be applied in universities to improve skills in learning web programming.

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