The Effect of Integrated Project based Learning MOOCs on Student Results of Vocational High School Students

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Abstract: MOOCs which is currently known as one of the gates of learning in the XXI century into technology-based learning that has advantages in the learning process, the learning must integrate a blend of conventional models and digital shields in their application. This study aims to determine the results of the combination of digitalization of learning that is characterized by MOOCs that are integrated with the PJBL (project-based learning) model. The study design used an experimental research design that used a quasi-experimental design with the mechanism of pretest and posttest through group design. The population in this study were all students of class X of Batu Islam Vocational High School 2018/2019 which totaled 259 students, this was due to the vocational high school had long used the PJBL through a series of approaches to produce student work products that could be exhibited regularly while the school was holding the certain event. The sample used is two classes. The instruments used were questionnaire sheets, student affective sheets, project assessments, and written tests. Hypothesis testing uses t-test and simple linear regression. The results of the t-test conclude the differences between the significant variables of multimedia learning outcomes between the experimental and control groups. The results of a simple linear regression test concluded that there is a significant effect between the application of an integrated MOOC PJBL on the learning outcomes of vocational students in the experimental group whose influence can be predicted through a regression equation that gives rise to effective and relative contributions of each variable.

1 INTRODUCTION

MOOC (Massive Open Online Course) is a new paradigm of learning development based on digital content (Suswanto et al., 2017), the new paradigm raises variation of learning which is expected to improve the quality of learning process and the quality of student learning outcomes. Learning is a process that is more than just receiving information, memorizing and memorizing in learning. In order to truly understand and apply his knowledge, students must find problems and then grapple with ideas to find ways to solve the problem.With learning that tends to be centered on teacher students are more passive in receiving information and have less opportunity to develop their creativity. In this case the student assumes that his role is only as a spectator only and they feel that the teacher will provide knowledge only if they are present in the classroom. This situation makes the students less motivated and less responsible in teaching and learning process and it will affect the quality of learning that is not only seen from the results of learning alone, but also from the process.

MOOC integrates with PJBL (project-based learning) to be one solution to answer it, because it focuses on digitizing results and focuses on the concept of learning development through a discipline, involving students in problem-solving activities and other learning tasks, giving students opportunities for brainstorming, working in groups, and peak producing valuable, creative and innovative student work products (MayTruong 2016). MOOC also provides an important role to provide creative self-directed learning assisted by video and animation, and other literature as a source of science besides teachers, This will make students more active in reconstructing and concluding a problem so that with the application of learning fusion can improve student learning outcomes vocational schools (Stracke and Teixeira n.d.). Learning in vocational schools especially in Batu

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Islam Vocational Schools has actually used the use of a project-based learning approach through craft and entrepreneurship subjects, but it is problematic when teachers get assignments outside the classroom, students are not active in learning without assistance from teachers. Integration of MOOC with PJBL will provide solutions to problems like this so that even though teachers and students are separated by distance and time do not interfere with learning because it can be done through asynchronous and synchronous.

2 LITERATURE REVIEW

2.1 MOOCs

MOOCs are a development of open-distance learning (PTJJ) in the form of online courses as well as open and large open course materials with the aim of enabling unlimited participation and accessible through LMS (Learning Management System). In addition to providing conventional content of material and image texts, MOOCs also provide video, animation and discussion of issues (case studies), MOOCs also provide an interactive user forum that helps in building communities for educators and vocational school learners(Zee et al., n.d.).

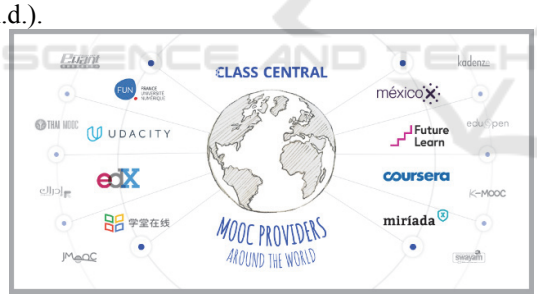

Figure 1: MOOCs Providers Around The World (source: online, https://www.class-central.com/report/mooc-providers-list/)

MOOCs began to be introduced in 2013, until now MOOCs have grown to more than 10 providers, in figure 1 seen EDX, COURSERA, UDACITY, MIRIADA etc occupy the ranks of MOOCs in the world. In Indonesia alone MOOCs began to be known in early 2015 which marked the start of a busy development of LMS used with Blended Learning.

2.2 PJBL

PJBL (project-based learning) is different from PBL (problem-based learning), although there are similarities between the two. The similarity is that both types of learning are science-based science of mercury, emphasizing active student learning environment, group work (collaborative), and authentic assessment approach (authentic assessment). The difference lies in the difference of objects. In PBL, students are more encouraged in activities that require problem formulation, data collection, and data analysis (related to the diagnostic process), in PJBL students are more encouraged in design activities: formulating jobs, designing (designing), calculating, project, and evaluate results.

PJBL emphasizes the creativity of learners to make projects from environmental issues, through a series of activities that are gradual, learners are invited to convey and listen to ideas, reflect the framework of ideas and develop it in a project. Interaction process is what makes PJBL able juxtaposed with MOOCs that notabennya use of technology needed when extracting ideas from the digital world. The role of PJBL in learning is maximal if supported by an authentic learning environment through a series of stages ranging from 1). Apperception; 2). Introduction of material; 3). Interlude material; 4). Main material and 5). Evaluation (Richmond and Striley, 1996).

PJBL is actually not new learning, PJBL has the potential to be developed thoroughly in the aspect of education because it focuses on a result to be achieved by learners. PJBL is not only used in education, but it is also used in the world of work, this is why PJBL is currently used as one of the good methods to develop creativity and work ethic appropriate for 21st-century learning.

2.3 LEARNING OUTCOMES

Learning outcomes are defined as the ability possessed by students after receiving the learning experience .In the national education system the formulation of educational purposes using the classification of learning outcomes according to Bloom that broadly divides into 3 domains, namely affective, psychomotor, and cognitive domains. The details are as follows: a). Cognitive Sphere, with respect to intellectual learning outcomes consisting of six aspects: knowledge, understanding, application, analysis, synthesis and assessment; b). Affective Sphere, with respect to attitudes and

values. Affective spheres include five levels of ability to accept, answer or react, rate, organization and characterize with a value or complex value; c). Psychomotor domains, covering motor skills, manipulation of objects, neuromuscular coordination (linking, observing),(Thompson, Christensen, and Wittmann 2011), the full picture in figure 2. The types of cognitive learning outcomes are more dominant than affective and psychomotor because they are more prominent, but affective and psychomotor learning results should also be part of the assessment results in the learning process in school.

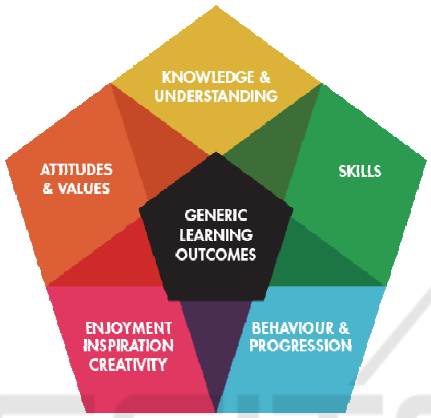

Figure 2: Learning Outcomes (source:(Nidhom, KH, and Sudjimat 2015)

Learning outcomes are the abilities possessed by learners after they have received the learning experience through a series of learning processes. Learning outcomes are used by educators to be used as criteria, measures and benchmarks in achieving a learning objective. This can be achieved if the student has understood the learning accompanied by a change in behavior that is better afterward. (Wheeler 2015), divides 3 kinds of learning outcomes: (1) skill through a series of habits, (2) knowledge through the process of understanding, (3) attitudes seen from the desire to change.

3 METHODS

This study is an experimental study using quasi-experimental design. The use of the design aims to investigate possible cause-and-effect by using more than one experimental group with different treatment conditions. In this study the classes have been formed prior to the research so that research is not possible to randomly change the members of each class. The research designs used are listed in Table 1.

Table 1: Research Design Tabel

Group	Initial Test	Treatment	Learning Outcome test
Exp.	O_1	X_1	O_2
Control	O_1	X_2	O_2

Notes:
Exp = Experiment Class
Cont = Control Class
O_1 = Initial Measurement
O_2 = Final Measurement
X_1 = MOOCs PJBL
X_2 = LMS Learning

In both groups (experiments and controls) preceded by a pre test after it was treated, at the end of the treatment was done post test in both groups.

The instrument used is a questionnaire to test the successful use of integrated PJBL MOOCs and the value of multimedia learning outcomes due to the integrated use of MOOCs PJBL. For measurement of learning result data using t-test and continued using linear regression to reveal effective contribution and relative donation of MOOCs usage and use of LMS in control class.

4 RESULTS

Student learning result data is the value data obtained after the students were given the treatment obtained from the sum of 30% posttest value, 20% affective value and 50% value of the project. From the result of the average learning result, it is known that the experimental class average value (81.00) is higher than the control class average (76.00). From the results of research and data analysis using SPSS can be seen that there are differences in learning outcomes between control classes and experimental class. Student learning result data is obtained from data of posttest value, project value, and affective value of student in terms of student affective appraisal rubric, product observation rubric, presentation observation rubric and report portfolio. Description of student learning result data for posttest can be seen in Table 2.

Tabel 2: Student Result for Post-test Data

Group	No.of students	Min	Max	Mean	Std. Dev.
Exp.	29	75	85	78.25	4.487
Control	29	65	85	75.00	7.162

From Table 2 it can be seen that the average score obtained by the experimental class (Exp.) is higher than the average score obtained by the control class (Control). Test of end-ability data normality (student learning outcomes) experiment class and control class can be seen in Table 3.

Table 3: Normality Test of Student Result of Class of Experiment and Control Class

Group	N	$\bar{x}$	Std Dev	Asym p-Sig	Conclu-sion
Expe-riment	29	81,00	6.621	,355	Normal
Control	29	75.76	8.264	,236	Normal

In Table 3 it can be explained that the students' learning outcomes of the experimental class and the control class have a probability value (Asymp-Sig) greater than 0.05, then the data is normal.

Tabel 4: Test-t Two Parties Data Learning Results Student Test-t Two Parties Data Results in Student Learning

Group	$\bar{x}$	N	$_{test}$	t_{able}
Experiment	81,0656	29	2,666	1,740
Control	77.4232	29		

5 DISCUSSION

In Table 4 it can be seen that the students' learning outcomes have a greater than a t_{able}, so Ho is rejected and H_1 accepted, so there are differences in learning outcomes between students taught by Project Based Learning model using Brain Storming approach with direct learning demonstration. Based on t_{-test} results and the average obtained in Table 4 also can be stated that the students' learning outcomes of the experimental class are higher than the control class. the average initial ability of students obtained by the experimental group is 66.48 with a standard deviation of 9,113. While the average obtained a control group of 69.17 with a standard deviation of 8.358. Descriptively, the average experimental group is higher than the control group average. This means that there is a difference in the students' initial ability of the experimental group and the control group. However, in Table 3 it can be proved that there is no difference in the students' initial ability of the experimental group and the control group because the obtained $_{count}$ of 1,171 is smaller than $_{table}$ 1.740. (H_0 accepted). Whereas if looking at the probability (significant level) using Sig criteria. (p) = 0.548 is greater than 0.05, so the assumption of research which states that both groups of samples have the same level of ability can be proven.

6 CONCLUSION

Based on the results of the research and data analysis, the conclusions can be obtained as follows: There are significant differences in multimedia learning outcomes between the experimental groups taught by the application of PJBL integrated MOCCs with the control group taught with LMS, as evidenced by hypothesis testing on the result and discussion In addition, there is also a significant effect between the application of PJBL integrated MOOCs on multimedia learning outcomes in the experimental group, as evidenced by simple linear regression analysis that produces a significance value that is much smaller than the normal boundary of the intersection, so Ho is rejected and Ha is accepted. Based on the results of research and discussion that has been described, it can be given suggestions including: For schools, the results of this study are expected to be a consideration in an effort to improve the application of learning models in vocational schools, because learning with the application of integrated PJBL MOOCs has been shown to improve student learning outcomes. For teachers, good time management is needed for the implementation of learning, so that students can really use the time to discuss, explore students' creative ideas, conduct group practicum, and understand the material being studied. For students, it is expected to be able to use education well because the teacher has tried to provide the best service as best as possible.

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