

The Application of Blended Learning with a Community Science Technology Approach to Improve Student Learning Outcomes in Higher Education

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Abstract—This study aims to analyze the effect of the blended learning science and technology community approach on student learning outcomes in higher education. The research design used in this study was quasi-experimental with The Matching - Only Post - test - Only Control Group Design. A total of 120 students participated in this study. Subjects were divided into 2 groups, namely the control group (K1) and the treatment group (K2). The instrument of learning outcomes items will first be tested for validity and reliability, then the learning outcomes data that have been obtained will be analyzed using the independent t-test method. The results of this study indicate that the data from the validity test items of the learning outcomes test instrument, out of 40 question items, there are 38 items that are declared valid. reliability test results with an alpha coefficient of 0.880 so that the learning outcomes test instrument is said to be reliable and consistent in data collection. The results of the t-test obtained $P < 0.05$, meaning that there is a significant effect of blended learning with the science technology approach of society on learning outcomes. It can be concluded that blended learning with a community science technology approach can improve student learning outcomes in higher education. It is hoped that blended learning can be used and developed again in learning in higher education.

Keywords—blended learning, community science technology, learning outcomes

1 Introduction

Higher education has a sharp spotlight in the world of education because of the responsibility of producing superior and quality graduates [1,2]. The strategic function of universities as higher institutions in the world of education, so that it becomes a big hope to produce graduates who are able to answer challenges [3,4]. The activities of the education implementation process will be a high expectation if they have the ability to learn effectively and efficiently to the ability to develop their capacity [5].

There is an assessment that the learning activities in universities have not been carried out optimally so the output of graduates is also not optimal in facing future challenges 6. If we pay attention to the perspective of students, there are at least 3 things

that are not optimal, namely, students have not been able to organize learning activities that are in accordance with the times, namely in educational technology, there are errors in interpreting the learning process and the use of learning concepts that are less relevant to the development of educational technology [7]. Passive activities that are owned by students only listen to information from the teacher and are weak and less serious in understanding the content of lecture material [8,9]. In addition, there are also causes for the weak learning process, namely learning activities that only contain news or information, have not been directed to an interesting and fun learning atmosphere, have not led to an active learning process to build knowledge independently, so that the atmosphere in learning it feels boring [10,11].

Alternative solutions need to be found to overcome these problems, one of the learning methods that can be used is blended learning with a community science technology approach. In general, blended learning is a compilation of two lessons, uniting pedagogical teaching methods and theories, and uniting two learning models during and offline [12,13]. In the current era, it is undeniable that the presence of technology in the world of education is very important to change the learning system for the better [14,15]. An internet network that connects to a network of smartphones, computers, and so on is something that is able to provide big changes in finding learning resources [16]. These activities are not limited by space and time, so accessing them can be done anywhere [17]. In this regard, the community science technology approach is an approach that connects science learning in the classroom with technological advances and community development. Until now, there are few reports on blended learning with the community science and technology community approach to learning outcomes.

This study aims to analyze blended learning with a community science technology approach to improve student learning outcomes in higher education.

2 Research methods

The research design used was quasi-experimental with The Matching-Only Post-test-Only Control Group Design. A total of 120 students participated in this study. The research subjects were divided into 2 groups, namely the control group (K1) and the treatment group (K2). This research requires validity on the instrument of learning outcomes. Furthermore, a reliability test was conducted to find out whether the instrument for learning outcomes was accurate and consistently used to measure learning outcomes. After testing the validity and reliability, the learning outcomes data that have been obtained will be tested using the independent t-test method.

3 Results

3.1 Instrument validity test

Test the validity of the test items to measure learning outcomes with statistical tests to determine whether the items are valid or not. This validity test uses the microsoft

excel pearson product moment correlation. Each item is tested for correlation with the total score. The calculated correlation coefficient value (r-count) is compared with the table correlation coefficient value (r-table), namely n = 35 the r-table value is 0.333. The results of the validity of the test items are presented in Table 1.

Table 1. Item validity test results

Item Number	Calculate Correlation Coefficient	Information	Item Number	Calculate Correlation Coefficient	Information
1	0,499	Valid	21	0,510	Valid
2	0,357	Valid	22	0,498	Valid
3	0,513	Valid	23	0,362	Valid
4	0,377	Valid	24	0,386	Valid
5	0,451	Valid	25	0,348	Valid
6	0,324	Invalid	26	0,390	Valid
7	0,391	Valid	27	0,338	Valid
8	0,489	Valid	28	0,513	Valid
9	0,357	Valid	29	0,327	Invalid
10	0,484	Valid	30	0,481	Valid
11	0,358	Valid	31	0,338	Valid
12	0,466	Valid	32	0,391	Valid
13	0,396	Valid	33	0,471	Valid
14	0,529	Valid	34	0,357	Valid
15	0,335	Valid	35	0,484	Valid
16	0,537	Valid	36	0,358	Valid
17	0,362	Valid	37	0,346	Valid
18	0,383	Valid	38	0,424	Valid
19	0,462	Valid	39	0,509	Valid
20	0,492	Valid	40	0,430	Valid

Data from the test results of the validity of the items of the learning outcomes test instrument, from 40 question items there were 38 items that were declared valid.

3.2 Instrument reliability test

Based on the results of the alpha coefficient reliability test, the learning outcome test instrument is said to be reliable and consistent in data collection.

Table 2. Item reability test results

Number of Question Items	Alpha coefficient	Reliability
40	0,880	high

3.3 T-test learning outcomes

Based on Table 2 shows that the results of the t-test with $p < 0.05$ so it can be concluded that there is a significant effect of blended learning with the science technology approach of society on learning outcomes. Students who received blended learning treatment with a community science technology approach obtained better learning outcomes than students who did not receive blended learning treatment.

Table 3. The mean and standard deviation of the learning outcomes of the two groups

Group	N	Learning outcomes $\bar{x} \pm SD$
K1	60	74,73 \pm 2,201
K2	60	84,57 \pm 2,295

Table 4. Different test results

Different Test Method	P
Independent t-test	0,000

4 Discussion

This study focuses on student learning outcomes after the learning process is given blended learning treatment and compared with student learning outcomes obtained by the untreated group. In several studies, blended learning has had a positive impact. In Yilmaz's research (2020) [18] it shows that blended learning provides learning outcomes with positive experiences, can help reduce fear of learning materials, have high learning enjoyment.

Another study conducted by Hamad (2017) [19] showed that blended learning helped strengthen students' motivation toward learning and positively affected their learning outcomes, but poor internet access had a negative effect on the implementation of blended learning. In addition, it is reinforced by research by Khader (2016) [20] which shows that the blended learning experiment provides learning outcomes by increasing student achievement compared to the control group. Improving learning achievement through blended learning eliminates the boredom of students through educational sites and gives them fun while studying in an interesting and fun atmosphere that they have not experienced [21]. Blended learning provides a new method in education where students feel pleasure, interest, and interaction. Several previous studies have described about blended learning has a positive impact on learning outcomes.

Our research finds that the role of blended learning in the science and technology approach of society is to facilitate the best possible way to improve student learning outcomes in higher education. This was done to two classes, namely the control group who were treated with blended learning without video assistance and the experimenter who was given the blended learning treatment of the community science technology approach. Student characteristics and learning design features of blended learning are

important factors for the effectiveness of blended learning. The learning outcomes obtained are able to critically assess and evaluate sources of knowledge.

Learning outcomes must be considered in order to properly link online and offline learning and to create an environment that ensures the achievement of these outcomes. Improving learning achievement through blended learning eliminates the boredom of students through educational sites and gives them fun while studying in an interesting and fun atmosphere that they have not experienced. Blended learning provides a new method in education where students feel fun, interested, and interact. Several previous studies have described about blended learning has a positive impact on learning outcomes. Previous research is in line with the research conducted this time that the effect of blended learning with the science technology approach of society on learning outcomes has a significant effect.

5 Conclusion

If viewed from the results of the study, it can be seen that the experimental group obtained higher learning outcomes than the control group. When compared with the uninfluenced group, the difference in the value of learning outcomes obtained is not far from the initial value, while the experimental group that has been given treatment obtains learning outcomes that are much higher than those in the control group. This proves that blended learning with a community science technology approach has an influence on learning outcomes, which can improve learning outcomes.

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