JVCE 3 (2) (2018) : 168 - 177

Journal of Vocational Career Education

http://journal.unnes.ac.id/sju/index.php/jise

Development of Learning Method Blended Flipped Classroom of in Algorithm and Programming

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Article Info

Article History :
Received Agustus 2018
Accepted October 2018
Published December 2018

Keywords:
blended learning, flipped classroom, learning attitude, interest in learning, learning competence

Abstract

The purpose of this research is to develop learning e-learning-based as a solution in improving attitudes, interests and competence of student learning in particular PTIK employee class in the subject matter of programming dam algorithm looping /looping.The research method used follows the steps of Sugiyono but the researcher only took 4 (four) stages of research, namely 1) preliminary stage, 2) development stage, 3) validation stage and 4) implementation phase. The essence of this study is to look for differences between attitudes, interests and learning competencies before and after the application of-based elearninglearning. The results showed a difference in attitude percentage of 12.13%, the difference in percentage interest of 18.23% and the results of student learning competencies were seen from the average score of pretest of 73.16 and theaverage score posttests of 89.63 with the test results the gain is 1 with high criteria. Thus it can be concluded that the results of the development oflearning in blended themethod flipped classroom can improve the attitudes, interests and learning competencies of employees of the PTIK class. This finding is the development of the blended learning method of flipped classroom, a learning method that can be applied at the college level that has employee classes.learning in Blended themethod flipped classroom can be used as a reference in new learning in college.

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p-ISSN 2252-6412
e-ISSN 2502-4523

INTRODUCTION

The development of information technology today is growing rapidly along with the discovery and development of science in the field of information so as to be able to create tools that support the development of information technology, ranging from information systems to communication tools. Including the *internet,* where in recent years people have no longer been limited to searching for and getting information on print, radio and television but making global network technology a new means of information. The internet is also one of the main sources of information. Today's internet plays many roles in human life. The advancement of technology is something that cannot be avoided in this life, because technological progress will run according to the progress of science (Ngafifi, 2014). And these technological advancements are used in various fields, such as doing school work, studying, managing finances, listening to music, watching videos and enjoying games.

Technological developments also have an impact on the education sector in Indonesia, many instructors who develop learning media as learning tools are seen in research (Ika Umaya Sinta, 2013) with the title Development of Learning Model Helped by Interactive Learning Media (Mpi) to Develop Entrepreneurial Interest in Sos Residents Taruna Village Semarang examines interactive learning media as teaching aids to develop interest in entrepreneurship.

Other research that develops learning that utilizes technological developments is (Akaat Hasjiandito, 2014) with the research title Development of Learning Models in Learning *Blended Learning* Project-Based Media Courses at the PGPAUD UNNES Department, which examines developing learning models *blended* which combine face-to-face learning and learning *online*. Included in the study (Muhammad Ridha, 2016) with the title The Effect of *Classified Flipped Mastery on the* Acquisition of Student Cognitive Learning Outcomes, usinglearning *flipped* to improve student cognitive learning outcomes.

With some of these studies, the author's reference in finding solutions to constraints in Informatics and Computer Education (PTIK) students at the College of Teacher Training and Education (STKIP) Invada is specifically the class of employees who have difficulties in attending school due to out-of-town or overtime service assignments seen in the meeting before midterm (UTS) for algorithmic and programming courses from a total of 32 students who 100% attendance (7 meetings) only 50% of the total students, learning attitudes and learning interests are lacking due to fatigue after work seen from the lack of students who are active in the classroom and ultimately have an impact on student competency outcomes that are not good at the UTS score below 85. So learning innovations that can improve attitudes, interests and learning competencies of PTIK students, especially the employee class are needed.

One learning innovation that needs to be done to overcome these problems is by combining face-to-face / conventional learning with *e-learning* and using the *flipped classroom* method or an inverse method where students get material through *e-learning* and face-to-face learning filled with practice or discussion. It is hoped that students will be better prepared to receive material, discussion and practice when face to face. The reason for using *blended learning* is the result of research (Syarif, 2012) with the research title Effect of Blended Learning Model on Motivation and Learning Achievement of Vocational Students shows that there are significant differences in learning motivation between conventional classes and classes using *blended learning*, there are differences in learning achievement significantly between conventional classes and classes using *blended learning*.

The final objective of this study is 1) to develop learning *blended learning* methods *classroom* that can be used in algorithmic courses and PTIK study program programming in STKIP Invada, 2) test the feasibility of developing learning *blended* methods *classroom* and 3) test the effectiveness of developing attitudes toward learning , the interest and learning competencies of the employee class PTIK students.

METHODS

In this study the author adheres to the research method from Sugiyono that R & D has ten stages, namely 1) potential and problems, 2) data collection, 3) product design, 4) design validation, 5) design revisions, 6) product testing, 7) product revision, 8) trial usage, 9) product revision and 10) mass production, but the author simplifies the research procedure in the form of 1) the proposition stage, 2) the development stage, 3) the validation stage and 4) the implementation stage. The first step that must be done is the initial research related to the learning that will be developed. Based on preliminary research planned a learning that will be a solution that is' development learning *blended* with methods *flipped classroom* premises using the *platform Edmodo* in the subject of algorithms and programming ", so that made the development of learning in basic competencies material *looping* and final phase will be tested .

Development of blended learning with the method *Flipped Classroom* on the algorithm and programming courses produced by using the application *Edmodo*. From the results of the research and development steps described in the following chart:

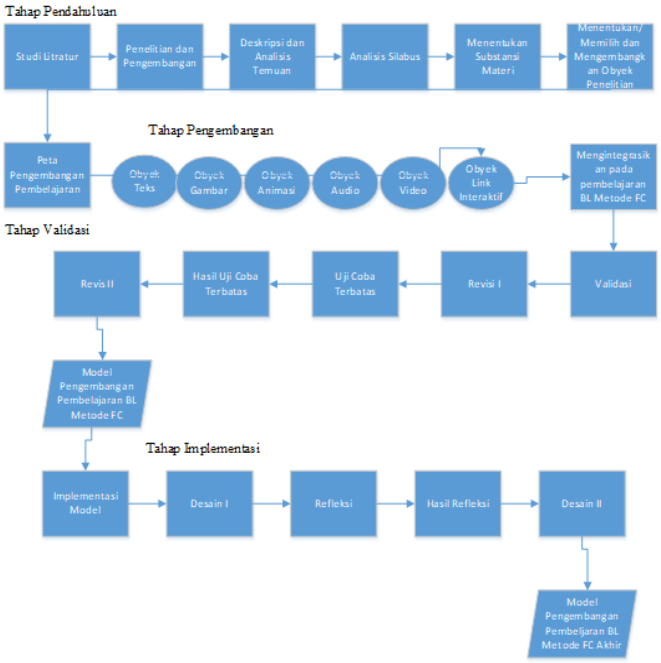

Figure 1. Steps of Research and Development

Data were collected using the following techniques 1) test validity and reliability to test the questionnaire that will be used as a measure of the feasibility of learning *blended* method *flipped classroom* which was filled by material validators and media, 2) questionnaire attitudes and interest in learning before and after treatment and 3) pre test and post test were used to assess competency before and after treatment. The instrument used in this study was a questionnaire, pretest and posttest. According to (Sugiyono, 2015) in the world of education there are 2 (two) types of instruments, namely instruments in the form of tests to measure learning achievement and non-test instruments to measure attitudes.

Data collection techniques for student learning attitudes and interests using questionnaires were distributed before and after the application of learning *blended* methods *classroom*. Aside from the questionnaire, the researcher also observed student attitudes and interests before and after the application of learning in *blended* the method *flipped classroom* on algorithmic and programming subjects. The sub-variables of the student learning attitude questionnaire are 1) accepting, 2) responding and 3) appreciating and sub-questionnaire variables from student learning interests, namely 1) interest, 2) being friendly and 3) happy.

To measure the learning competencies of students the researchers used the test method, where the test was carried out before treatment and testing after treatment. Tests given before and after treatment in the form of a practical question of algorithms and programming subject matter looping.

RESULTS AND DISCUSSION

Development of Learning *Blended* Methods in *Flipped Classroom* Algorithm and Programming Courses The

development of learning produced in this study in the form of learning design in *blended* the method *flipped classroom* which is illustrated in Figure 2 is in the form of learning *blended* method *flipped classroom* as follows;

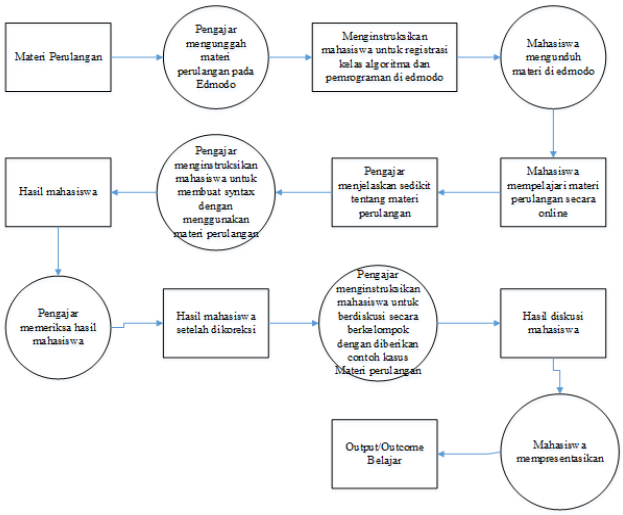

Figure 2. Learning Flow of *Blended* the Method *Flipped Classroom*

Feasibility Test for the Development of Learning *Blended* Method *Flipped Classroom*

Testing the material feasibility and media *blended learning* method is *flipped classroom* done by material experts and media experts with validation flow shown in Figure 3 below:

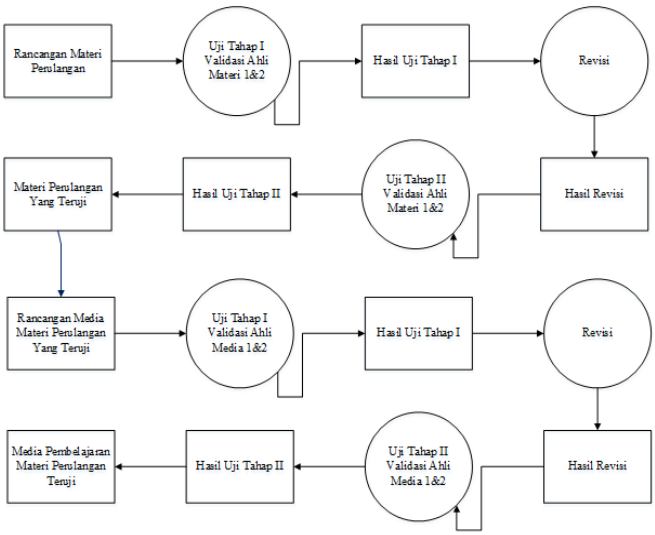

Figure 3. Flow of Material and Media Expert Validation

a. Test the Validity of Material Experts

Test the validity of this material by using an instrument in the form of a questionnaire attached to the appendix. This questionnaire consists of 26 questions that have 5 (five) alternative answers in the

form of very good with 5 (five) points, both with 4 (four) points, enough with point (3), less than point 2 (two), and very less with point 1 (one). In addition there are 26 of the questions, the questionnaire also provides a validation of the comment column about the material loop */loop* uploaded on app, *Edmodo* so that the material could be further developed for the purpose of blended learning methods *flipped classroom* with platform *Edmodo* reached.

Table 1. Material Validation Test Results

Kriteria	N	Validator I	Validator II	Mean	Prosentase
Aspek Kelayakan Isi	12	38	45	3.46	69.2
Aspek Kelayakan Penyajian	5	21	16	3.7	74
Aspek Kelayakan	9	35	40	4.17	83.3
Jumlah	26	94	101		
Skor rata-rata				97.5	
Persentase Uji Validasi Ahli Materi				97.5	
Kriteria Kelayakan				Sangat Layak	

b. Test Validity of Media Experts

Test the validity of media experts by using instruments in the form of media expert validation questionnaires such as attachments 2. Media expert validation questionnaire consists of 10 items that have 5 alternative answers in the form of very good. good. sufficient. lacking and very less. In addition to the 10 statements. the media expert validation questionnaire also provides space to comment on the media as a means of blended learning method *flipped classroom*. The details of the results of media expert validation test results can be seen in table 2 below.

Table 2. Media Expert Validation Test Results

Kriteria	N	Validator I	Validator II	Mean	Prosentase
Aspek Penyajian	2	10	9	9.5	95
Aspek Kelayakan Terhadap Stategi Pembelajaran	4	14	16	7. 5	75
Aspek Kelayakan Tampilan Menyeluruh	4	14	14	7.0	70
Jumlah	10	38	39		
Skor rata-rata				8.0	
Persentase Uji Validasi Ahli Materi				77.0	
Kriteria Kelayakan				Sangat Layak	

c. Learning Attitudes The

Research data was generated from questionnaires that were filled out by students both before treatment and after treatment. Data on student learning attitudes were obtained through closed topics with 8 items in question. The scores used in the questionnaire are 1 to 5. so based on these scores the learning attitude variable has a range of scores from 29 to 35.

1. Description of data before treatment

Research data on attitude attitude scores can be seen in Figure 4.

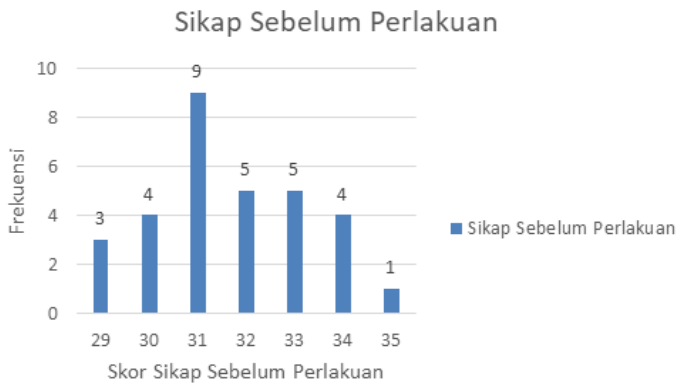

Figure 4. Behavioral Scores Before Treatment

The results of the calculation of student learning attitude scores before treatment. based on Figure 4. obtained the number of samples = 32; average score (mean) = 31.50; standard deviation = 1.88; variance = 3.55 and total score = 1008.

1. Description of data after treatment

Data on study of learning attitude scores can be seen in Figure 5

Figure 5. Attitude Diagram After Treatment The

results of the calculation of student learning attitude scores after treatment. based on Figure 3. obtained the number of samples = 32; mean score = 36.34; standard deviation = 1.01; variance = 1.01 and total score = 1163.

Results of student learning attitudes before and after treatment if labeled as follows:

Table 2. Comparison Tables Before and After Treatment

	n	$\sum$	$\bar{x}$	s^2	s
Sebelum	32	1008	31.50	3.55	1.88
Sesudah	32	1129	36.34	1.01	1.01

Described from table 3 for 32 students who have filled out questionnaires / questionnaires before the implementation of blended learning methods *flipped classroom* obtained the value of the average learning attitude scale of 31.50. After the implementation of the learning obtained the questionnaire average value / questionnaire 36.34. The test results can be seen as follows:

Tabel 4. Paired Samples Test Sikap

		Paired Differences					t	df	Sig. (2-tailed)
					95 Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Sebelum - sesudah	-4.844	2.157	.381	-5.621	-4.066	-12.704	31	.000

The test results show that the value of t is equal to -12.704 with sig. (2 –tailed) 0.00 <0.05. Can be interpreted. there are differences between attitudes to learning before and after learning *blended* method *classroom flipped* with an increase of 12.13.

d. Interest in Learning

This research data was generated from questionnaires that were filled out by students both before treatment and after treatment. Data about students' interest in learning is obtained through a closed questionnaire with 7 items in question. The scores used in the questionnaire are 1 to 5. so based on these scores the learning attitude variable has a score range of 21 to 27.

1. Description of data before treatment

Data on research scores on learning interest can be seen in Figure 6

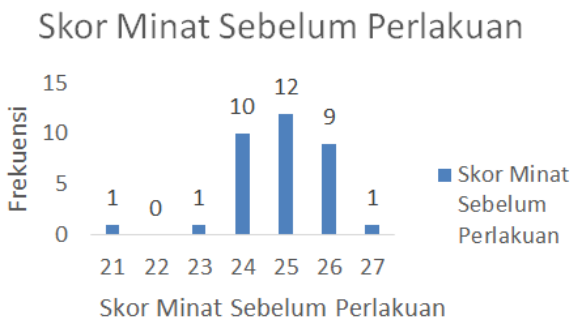

Figure 6. Diagram of Interest Before Treatment The

results of the calculation of student learning interest scores before treatment. based on Figure 6 above. obtained the number of samples = 32; average score (mean) = 24.78; standard deviation = 1.13; variance = 1.27 and total score = 793.

2. Description of data after treatment

Data on research on interest in learning attitudes can be seen in Figure 7

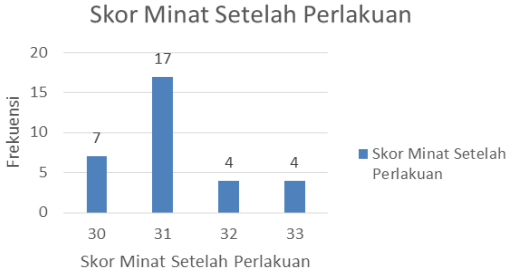

Figure 7. Interest Score Diagram After Treatment

results of the calculation of student learning interest scores after treatment. based on Figure 4.10. obtained the number of samples = 32; mean score = 31.16; standard deviation = 0.92; variance = 0.89 and total score = 997.

Results of student learning interest before and after treatment if labeled as follows:

Table 5. Table Comparison of Interests Before and After Treatment

	n	∑	$\bar{x}$	s^2	s
Sebelum	32	793	24.78	1.27	1.13
Sesudah	32	997	31.16	0.98	0.92

Described from table 5 for 32 students who have filled out questionnaires / questionnaires before the implementation of blended learning methods *flipped classroom* obtained the average value of the learning interest scale of 24.78. After the implementation of the learning is obtained the average value of the questionnaire / questionnaire 31.16. The test results can be seen as follows:

Tabel 6. Paired Samples Test Minat Belajar

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95 Confidence Interval of the Difference Lower	Upper			
Pair 1	Sebelum Sesudah	- -6.375	1.338	.237	-6.857	-5.893	-26.952	3	1.000

The test results show that the value of t count is equal to -25.952 with sig. (2 –tailed) 0.00 <0.05. It can be interpreted that there is a difference between interest before and after learning *blended* with an increase of 18.23.

e. Study Learning Competencies

Carried out in even semester 2017/2018 for Informatics and Computer Engineering Education students STKIP Invada. The data obtained from research on the development of *blended learning* methods *flipped classroom* is the result of *pre-test* and *post-test*. The data obtained is then quantitatively analyzed to obtain conclusions that apply to the entire study population. The results of the trial development of blended learning The method *flipped classroom* described was the result of trials *pretest* and *posttest.* With the results of the *pretest* and *posttest* can be seen from figure 8.

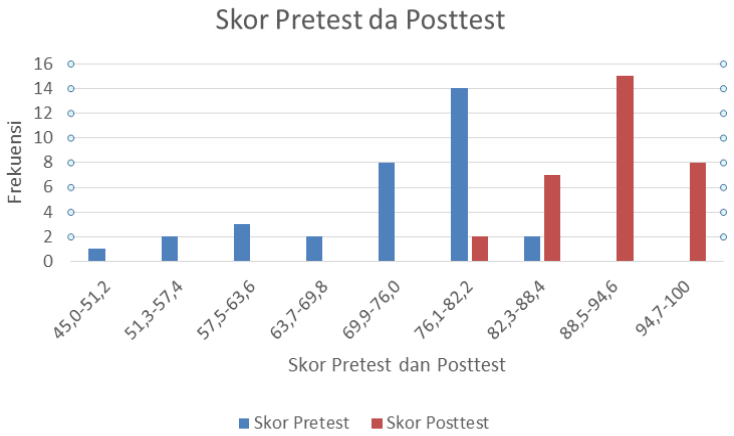

Figure 8. Pretest and Postest Scores

The results of these trials are illustrated in the following table using the normalized gain test:

Table 7. Results of *Pretest Posttest* and *Values*

Kriteria	n	Nilai Tertinggi	Nilai Terendah	Mean	s^2	s	Gain
Nilai *Pretest*	32	88	51	73.16	86.97	9.33	1 kriteria tinggi
Nilai *Posttest*	32	100	80	89.63	27.34	5.23	

Based on the table data. the average initial ability of students is 73.16 and the final average ability is 89.63. The highest value of the *pretest* is 88. while the lowest value is 51. The highest value in the result *posttest* is 100. while the lowest value is 80. The increase in the average score (*gain*) is 1 or in high criteria. And researchers conducted data processing using SPSS. namely one group t test (pretest and posttest). The test results can be seen as follows:

Tabel 8. One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Pretest	32	73.16	9.326	1.649
Posttest	32	89.63	5.229	.924

Tabel 9. One-Sample Test

	Test Value = 0					
					95 Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pretest	44.374	31	.000	73.156	69.79	76.52
Posttest	96.965	31	.000	89.625	87.74	91.51

Table one sample statistics and one-sample test show that the number of respondents 32 students all have the value of *pretest* and *posttest*. deviation freedom 31 value of 2 tailed 0.000 with confidence level 95. The average score of student pretest was 73.16 and the average posttest value was 89.63. Based on these results. it shows that student scores increase with an average score of 16.47 points.

Based on the results of the study. it was found that learning in *blended* the method *flipped classroom* had a different influence on the attitudes. interests and competencies of PTIK student learning. especially employee class students on algorithmic and programming subjects. It can be seen from each of the results of the study that 1) student learning attitudes before and after treatment there was an attitude increase of 12.13. Other studies such as (Weni Kartika Nugroho. 2016) also mention that there is an effect of approach on *blende learning* knowledge and attitudes of Semarang Kesatrian 1 High School students about acne vulgaris. 2) interest in student also changes seen from the average score of the questionnaire before treatment of 24 . 78 and the average score after treatment 31.16 which means that learning interest has an increase of 18.23. another study mentions (Rindaningsih. 2018) that in the multiple regression analysis there is a significant linear relationship with $\alpha = 0.05$ between variables (X1 = learning style and X2 = interest in learning) together against indogenous variables (Y2) with sig. 0.000 <than $\alpha = 0.05$. It was explained that the *flipped classroom had the* most influence on learning interest seen sig. 0.000 is much smaller than $\alpha = 0.01$. Likewise. also with 3) learning competencies that have increased. it can be seen from the results of the *pretest* and *posttest* that students' scores have increased by an average score of 16.47 points. explained in another study (Luh Rika Sukayanti. 2018) where the average learning outcomes test the *pretest* and *posttest* scores were then carried out by the t test with a significant level of 0.05. showing the average value of *pretest* 57.04 and the average value *posttest* of 90.37 knowing t count of 22.07 and t table 2.007 so t hitung > t table can be interpreted that *blended learning* method *flipped classroom* can improve student learning outcomes.

CONCLUSION

Based on the results of the previous research and discussion. it can be concluded 1) the development of learning in *blended* the method *flipped classroom* in learning practices the material is given *online* through *edmodo* and face-to-face learning activities are filled with discussion and practice. 2)

feasibility tests assessed by validators material and validators Media experts stated that the percentage of eligibility for material was 97.5 and the percentage of eligibility for media was 77.0 and 3) the development of learning in *blended* the method *flipped classroom* had a significant effect on the attitudes. interests and learning competencies of employees of PTIK students with an explanation of student learning attitudes before and after treatment increased by 12.13. interest in learning increased by 18.23 and learning competencies seen from the results of the *pretest* and *posttest* experienced an increase in the average score of 16.47 points.

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