PLT-B5-Learning Result-Atlantis Press.pdf

Learning Result Management on Vocational Blended Learning Implementation

Kadek Cahya Dewi[1]
Business Department
Politeknik Negeri Bali
Bali-Indonesia
[1]cahyadewi@pnb.ac.id

Putu Indah Ciptayani[3]
Electrical Engineering Department
Politeknik Negeri Bali
Bali-Indonesia
[3]putuindah@pnb.ac.id

Herman Dwi Surjono[2]
Department of IT Education
Universitas Negeri Yogyakarta
Yogyakarta-Indonesia
[2]hermansurjono@uny.ac.id

Priyanto[4]
Electronics and Informatics Department
Universitas Negeri Yogyakarta
Yogyakarta-Indonesia
[4]priyanto@uny.ac.id

Abstract—Vocational Blended Learning (VBL) has been applied in Information Systems Management courses at one of the vocational colleges in Indonesia. This research objective was to measure student learning result after going through the learning process with the VBL model. The research was conducted using descriptive statistical analysis techniques, with simple random sampling of 51 students who were divided into control class and experimental class. Learning results data were obtained through the comparison of the pretest and posttest results both in the field of theory and practice. The results in the control class showed that for the theoretical field there was an average increase in value of 18.619 points, the field of practice obtained an average increase in value of 75.72 points. While in the experimental class there was an average increase in value of 16,075 points for theory, and 76.8 points for practice. It can be concluded that there was no significant difference between conventional learning models (control class) and learning with blended learning models (experimental class). Therefor blended learning can be applied in vocational education through the Vocational Blended Learning model.

Keywords—blended learning; vocational; vocational blended learning

I. INTRODUCTION

The flexibility of blended learning in implementation makes it compatible to various models of the education system, as well as applied to the learning system of vocational education. Based on [1], vocational education can organize blended learning with Vocational Blended Learning model by applying rotation instructional model and supported by teacher-developed content. Blended learning has applied in different discipline of science, as in [2] blended learning method applied in data communication and computer networks subject. Another research applied the blended learning on undergraduate radiology education and show positive results [3]. One of institutes in India was prove a blended learning

platform that could blend the ICT with the tradiotional lecture [4].

According to Blended Learning Implementation Guide of Digital Learning Now Framework, there some stages namely planning, implement, and improve to implement blended learning. Evaluation is one step in improve. Evaluation has important role in manage blended learning. Institutions that implement blended learning should perform period evaluations [5]. There some research that already done in e-learning evaluation. Ozral et al found that e-learning evaluation considered the determinants of user perceived satisfaction, use, and individual impact of e-learning [6]. Nicolic et al research shown that the quality of e-learning was measure and evaluate from two perspectives, which are pedagogy and software development. Both of the perspectives should be analyzed during improving of quality of e-learning systems [7]. Another research from Drozdova et al, they considered Donald Kirkpatrick's four-level model of evaluation of training efficiency [8], Williams et al found that one of the evaluands categories were pedagogy that explained about course activities with student learning for the criteria [9].

As a continuation of [1], Vocational Blended Learning (VBL) model has been applied in Information Systems Management courses at one of the vocational colleges in Indonesia. The VBL implementation was done in a period of semester for about 6 months. To know how success was the Vocational Blended Learning implementation, the research measured the learning result of students after they're implementing VBL. Learning was one of the Kirkpatrick's level model [8], and student learning was one pedagogy criteria as in Williams et al research [9]. The research question was how the learning result on Vocational Blended Learning implementation in Information Systems Management courses. The research objective was to measure student learning result after going through the learning process with the VBL model.

II. METHOD

The research framework is shown in figure 1. The research was conducted using descriptive statistical analysis techniques for the learning result measurement. Student learning result measurement was carried out by the following steps:

1. Create a control class and an experimental class.
   The population of this research was 78 people that divided into three classes. The sampling technique was simple random sampling. It's taking two classes of total population, so the number of samples in this study was 51 people. The two classes are divided into control and experimental classes.

2. Provide an initial test (pretest) before students implemented vocational blended learning and final tests (posttest) when it's finished. Tests were conducted separately, namely theoretical tests and practice tests.

3. Analyze the results of pretests and posttests to obtain the effectiveness of the implementation of blended learning. Statistical analysis were conducted by measuring mean, median and modus from the pretest and posttest results both in the field of theory and practice.
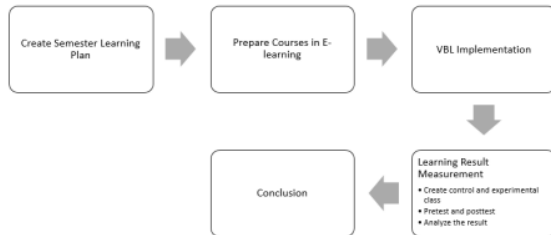

Fig. 1. Research Framework

III. RESULT AND DISCUSSION

Vocational Blended Learning (VBL) model (as shown in figure 2) implemented in Information System Management course. After implemented VBL, the next step was learning result measurement as the evaluation stage.

Input Stage

a. Human Resources Competencies

In the Information Systems Management course, the course participants (lecturers and students) had good IT skills. The lecturer had 17 years of IT experience and had been accustomed for preparing lecture material in digital form. The students have had 2.5 years of IT experience and have been accustomed for using supporting e-learning for 6 months.

b. IT Infrastructures

Information System Management courses were held in classrooms with good IT infrastructure readiness, which is connected to the internet network.
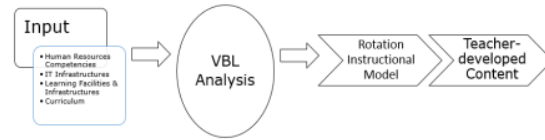

Fig. 2. Vocational Blended Learning Model [1]

c. Learning Facilities & Infrastructures

The success of the implementation of blended learning was also influenced by learning facilities and infrastructure. In Information Systems Management courses, lecture classrooms were equipped with LCD projector, cable, power, and wifi facilities. Because classrooms were not equipped with computer facilities, the lecturers and students bring their personal equipment ex. laptops.

d. Curriculum

The application of VBL in Information Systems Management courses was listed in the Semester Learning Plan (CPL) and lecture contracts.

VBL Analysis Stage

Based on the explanation at the Input stage of the VBL model, an analysis can be carried out that produces the instructional type of the selected model and the appropriate form of learning content. For Information Systems Management courses which are practical subjects with the implementation in the classroom, the instructional type of the model chosen is the Flipped Classroom model. Learning content is developed by lecturers by adjusting to the topics that have been stated in the SPL.

Rotation Instructional Model Stage

Figure 3 described rotation model classroom. Based on VBL analysis stage result, the choosen instructional model was flipped classroom model. Flipped classroom has the characteristic of having primary learning content online. Flipped classroom is defined as turning or exchanging learning activities in the classroom. Learning activities that are usually carried out face-to-face are now done through e-learning, while activities that are normally done outside the classroom are now conducted in the classroom. Submission of teaching materials, exercises and quizzes is done online. Discussion of project assignments and assistance is carried out face-to-face.
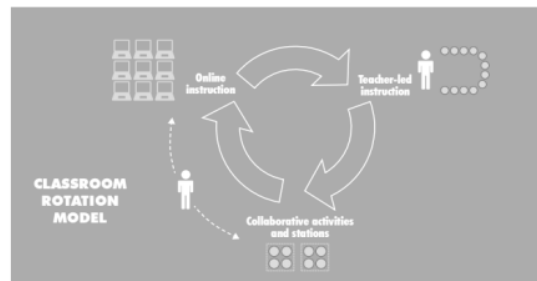

Fig. 3. Rotation Model Classroom [5]

mean	58,84615	77,465385	18,61923077	
median	60	90	23	
modus	90	100	61,4	

Teacher Developed Model Stage

In accordance with SPL and VBL model, learning content was provided online at e-learning by the teacher.

Learning Result Measurement Stage

Tests were distinguished between theory tests and practice tests. From the results obtained, then the calculation of the difference between posttest and pretest was done. Based on the difference value, it can be seen whether there was an increase or decrease in student learning value of Information System Management course after implementing vocational blended learning. The analysis results of the control class for the theory test can be seen in table 1 and the analysis results of the control class for the practice test can be seen in table 2. Table 3 showed the analysis results in the experimental class for the analysis theory test and table 4 showed the analysis results in the experimental class for the practice test.

Based on table 1, theory test result for the control class that implemented conventional learning model showed that there was 77,78% of student experienced an increase in learning result. They got an average increase in value of 18,619 points. Besides that in table 2, practical test result for the control class showed that there was 100% of student experienced an increase in learning result. They got an average increase in value of 75,72 points.

TABLE I.   CONTROL CLASS THEORY TEST RESULT

No	NIM	Pretest	Posttest	Difference	Explanation
1	1515744003	70	94,3	24,3	increase
2	1515744005	70	51,4	-18,6	decrease
3	1515744008	80	91,4	11,4	increase
4	1515744010	60	62,9	2,9	increase
5	1515744013	60	91,4	31,4	increase
6	1515744014	30	60	30	increase
7	1515744015	80	91,4	11,4	increase
8	1515744017	60	94,3	34,3	increase
9	1515744022	90	91,4	1,4	increase
11	1515744031	30	88,6	58,6	increase
12	1515744040	70	80	10	increase
13	1515744044	60	45,7	-14,3	decrease
14	1515744045	40	71,4	31,4	increase
15	1515744046	60	100	40	increase
16	1515744048	40	91,4	51,4	increase
17	1515744053	30	37,1	7,1	increase
18	1515744057	70	94,3	24,3	increase
19	1515744059	70	62,9	-7,1	decrease
20	1515744061	50	45,7	-4,3	decrease
21	1515744064	70	57,1	-12,9	decrease
22	1515744065	50	88,6	38,6	increase
23	1515744071	60	91,4	31,4	increase
24	1515744074	70	94,3	24,3	increase
25	1515744079	60	54,3	-5,7	decrease
26	1515744081	30	91,4	61,4	increase
27	1515744084	70	91,4	21,4	increase

TABLE II.   CONTROL CLASS PRACTICAL TEST RESULT

No	NIM	Pretest	Posttest	Difference	Explanation
1	1515744003	0	100	100	increase
2	1515744005	0	80	80	increase
3	1515744008	0	85	85	increase
4	1515744010	0	80	80	increase
5	1515744013	0	75	75	increase
6	1515744014	0	70	70	increase
7	1515744015	0	75	75	increase
8	1515744017	0	85	85	increase
9	1515744022	0	70	70	increase
10	1515744030	0	80	80	increase
11	1515744031	0	90	90	increase
12	1515744040	0	70	70	increase
13	1515744044	0	55	55	increase
14	1515744045	0	90	90	increase
15	1515744046	0	85	85	increase
16	1515744048	0	65	65	increase
17	1515744053	0	58	58	increase
18	1515744057	0	70	70	increase
19	1515744059	0	75	75	increase
20	1515744061	0	75	75	increase
21	1515744064	0	70	70	increase
22	1515744065	0	60	60	increase
23	1515744071	0	75	75	increase
24	1515744074	0	85	85	increase
25	1515744079	0	70	70	increase
26	1515744081	0	85	85	increase
27	1515744084	0	70	70	increase
	mean	0	75,72	75,72	
	median	0	75	75	
	modus	0	100	100	

TABLE III.   EXPERIMENTAL CLASS THEORY TEST RESULT

No	NIM	Pretest	Posttest	Difference	Explanation
1	1515744001	60	68,6	8,6	increase
2	1515744002	80	91,4	11,4	increase
3	1515744007	70	85,7	15,7	increase
4	1515744021	80	100	20	increase
6	1515744024	50	91,4	41,4	increase
7	1515744025	60	94,3	34,3	increase
8	1515744026	70	85,7	15,7	increase
9	1515744027	50	62,9	12,9	increase
10	1515744028	50	94,3	44,3	increase
11	1515744029	50	74,3	24,3	increase
12	1515744032	60	100	40	increase
13	1515744035	60	94,3	34,3	increase
14	1515744038	60	91,4	31,4	increase
15	1515744049	80	88,6	8,6	increase
16	1515744052	70	60	-10	decrease
17	1515744060	50	94,3	44,3	increase
18	1515744063	50	60	10	increase
19	1515744066	70	82,9	12,9	increase
20	1515744067	70	77,1	7,1	increase
21	1515744070	70	91,4	21,4	increase
22	1515744076	70	100	30	increase
23	1515744083	80	94,3	14,3	increase
24	1515744006	70	68,6	-1,4	decrease
	mean	72,5	88,575	16,075	
	median	70	93	18	
	modus	80	100	30	

TABLE IV.   EXPERIMENTAL CLASS PRACTICAL TEST RESULT

No	NIM	Pretest	Postest	Difference	Explanation
1	1515744001	0	85	85	increase
2	1515744002	0	80	80	increase
3	1515744007	0	80	80	increase
4	1515744021	0	95	95	increase
6	1515744024	0	83	83	increase
7	1515744025	0	75	75	increase
8	1515744026	0	80	80	increase
9	1515744027	0	75	75	increase
10	1515744028	0	85	85	increase
11	1515744029	0	95	95	increase
12	1515744032	0	98	98	increase
13	1515744035	0	95	95	increase

No	NIM	Pretest	Postest	Difference	Explanation
14	1515744038	0	85	85	increase
15	1515744049	0	78	78	increase
16	1515744052	0	85	85	increase
17	1515744060	0	75	75	increase
18	1515744063	0	20	20	increase
19	1515744066	0	75	75	increase
20	1515744067	0	75	75	increase
21	1515744070	0	80	80	increase
22	1515744076	0	85	85	increase
23	1515744083	0	85	85	increase
24	1515744006	0	68,6	68,6	increase
	mean	0	76,8	76,8	
	median	0	77	77	
	modus	0	85	85	

Based on table 3, theory test result for the experimental class that implemented vocational blended learning model showed that there was 91,67% of student experienced an increase in learning result. They got an average increase in value of 16,075 points. Besides that in table 2, practical test result for the experimental class showed that there was 100% of student experienced an increase in learning result. They got an average increase in value of 76,8 points. Resume of student learning measurement on VBL implementation in Information System Management course was described in table 5.

TABLE V.   RESUME OF STUDENT LEARNING MEASUREMENT

Model	Test	Persentage Increase of Students Learning	Average of Value of Increase
Conventional Model (Supporting e-learning)	Theory	77,78%	18,619
	Practice	100%	75,72
Vocational Blended Learning Model	Theory	91,67%	16,075
	Practice	100%	76,8

IV. CONCLUSION

Learning results data were obtained through the comparison of the pretest and posttest results both in the field of theory and practice. The results in the control class showed that for the theoretical field there was an average increase in value of 18,619 points, the field of practice obtained an average increase in value of 75,72 points. While in the experimental class there was an average increase in value of 16,075 points for theory, and 76,8 points for practice. It can be concluded that there was no significant difference between conventional learning models (control class) and learning with blended learning models (experimental class). Therefor blended learning can be applied in vocational education through the Vocational Blended Learning model.

REFERENCES

[1] K.C. Dewi, P.I. Ciptayani, H.D. Surjono, and Priyanto, "Modeling Vocational Blended Learning Based on Digital Learning Now Framework", The Turkish Online J. Educ. Tech., vol. 17, no. 2, pp. 89-96, 2018.

[2] F.N. Leite, E.S. Hoji, and H.A. Junior, "A Blended Learning Method Applied in Data Communication and Computer Networks Subject", IEEE Latin America Transactions, vol. 16, pp. 163–171, 2018.

[3] S. Zafar, S. Safdar, and A.N. Zafa, "Evaluation of Use of E-Learning in Undergraduate Radiology Education: A review", European J. Rad., vol. 83, no. 12, pp. 2277–2287, 2014.

[4] S. Tikadar, S. Bhattacharya, and V. Tamarapalli, "A Blended Learning Platform to Improve Teaching-Learning Experience", IEEE Proceed. [18th International Conference on Advanced Learning Technologies, 2018].

[5] J. Bailey, S. Ellis, C. Schenider, and K.A. Vander, "Blended Learning Implementation. Version 1.0 , 2013.

[6] W.A. Cidral, T. Oliveira, M.D. Felice, and M. Aparicio, "E-learning Success Determinants: Brazilian Empirical Study", Comp. & Educ, vol. 122, pp. 273-290, 2018.

[7] V. Nikolic, J. Kaljevic, S. Jovi, D. Petkovi, M. Milovan, L. Dimitrov, and P. Dachkinov, "Survey of Quality Models of E-Learning Systems", Phys. A: Stat. Mechanics and its App., vol. 511, pp. 324-330, 2018.

[8] A.A. Drozdova and A.L. Guseva, "Modern Technologies of E-learning and its Evaluation of Efficiency", Procedia – Soc. and Behav. Sci., vol. 237, pp. 1032–1038, 2017

[9] D.D. Williams and C.R. Graham, "Evaluating E-Learning", Int. Ency. Educ., pp. 530–538, 2010.

PLT-B5-Learning Result-Atlantis Press.pdf

7   Vlastimir Nikolić, Jelena Kaljevic, Srđan Jović, Dalibor Petković et al. "Survey of quality models of e-learning systems", Physica A: Statistical Mechanics and its Applications, 2018
    Crossref
    22 words — 1%

8   jurnal.untirta.ac.id
    Internet
    19 words — 1%

9   moam.info
    Internet
    19 words — 1%

10 Y Wangguway, S Kurniawati, I N Maylisa, Z L Al Jabbar, B Sulistiyono. "The analysis of STEM-PjBL implementation and its effect on students' metacognition skills in resolving social arithmetic problems", Journal of Physics: Conference Series, 2020
    Crossref
    18 words — 1%

11 K C Dewi, N W D Ayuni. "Government Readiness and Strategies in E-marketplace Planning using SWOT Analysis and Technology Readiness Index Model", Journal of Physics: Conference Series, 2020
    Crossref
    8 words — < 1%

12 worldwidescience.org
    Internet
    8 words — < 1%

13 Ying-Fang Hsu, Chi-Yu Chuang, Feng-Hsin Chang, Pei-Yi, Feng, Hsiao-Chien Huang, Shinhao Yang, Wei-Ting Liu. "Mycotoxins in the Dust Form Brewing Environment", IOP Conference Series: Earth and Environmental Science, 2021
    Crossref
    7 words — < 1%