The Influence of Learning Management Technology to Student's Learning Outcome

Taufiq Lilo Adi Sucipto[1], Agus Efendi[1], Husni Nadya Hanif[1] , Cucuk Budiyanto[1]
[1]Department of Information and Computer Education , Faculty of Teacher Training and Education, Universitas Sebelas Maret Indonesia

Corresponding email: taufiqlilo@fkip.uns.ac.id

Abstract

The study examines the influence of learning management systems to the implementation of flipped classroom model in a vocational school in Indonesia. The flipped classroom is relatively new educational model that inverts students' time to study on lectures and time spent on homework. Despite studies have been conducted on the model, few addressed the impact of the use of a learning management system to the performance of students involved in such learning model particularly within Indonesian educational systems context. A quasi-experiment approach was applied to an experiment class and another control class. Upon the analysis, the results emphasized previously held research outcomes. The use of Edmodo learning management systems enhances students' performance in the experiment class, relative to those of the control class.

Keywords: *learning management systems, flipped classroom, conventional learning, edmodo, vocational school, operating system*

DOI: http://dx.doi.org/10.20961/ijpte.v1i1.4606

Introduction

Flipped learning has emerged as a novel approach in delivering learning material. Coined by Jonathan Bergmann (Bergmann & Sams, 2012), the teaching method facilitates students to invert their learning time at school and time doing their homework at home. Despite the idea was suggested less than a decade ago, reports on the success stories and achievements flooded the educational publications in various field of studies (Basal, 2015; Pierce & Fox, 2012; Schultz, Duffield, Rasmussen, & Wageman, 2014). Student missed the classroom or absent from the class could have benefitted from the innovation in teaching (and learning) method. The flexibility to engage with information prior to entering classroom would potentially foster individual inquiry, collaborative effort, social interaction, reflection, and independent learning skill (Reyna, 2015).

Learning as a planned experience has becoming scholars' attention. The activities should attain behavioral and motivational changes (Ginting, 2008) Indeed, it is the main key to achieve the purpose of education. In conventional teaching-method, teachers dominate the classroom by pushing the knowledge through lecture-based learning. The effectiveness of one-way learning has been long questioned and the migration to the '*deep learning*' is advocated (Roehl, Reffy, & Shannon, 2013). Learning in such environment focuses on the students' activity and student engagement in learning processes. That it should be interactive, inspiring, fun, and motivate learner's active participation (Nasional, 2007).

Very little research, however, has been undertaken into flipped classroom approaches which could be considered as evidence-based (Abeysekera & Dawson, 2014). That the lack of cognitive and performance measurement of students attending flipped lessons calls for further elaboration.

This study examines the influence of learning management systems to the implementation of flipped classroom model in a vocational school in Indonesia. Despite similar studies have been reported in scholarly publications, this research distances from other research carried out in the more-developed societies (see for example Schultz et al. (2014), Bakr, Massey, and Massa (2016), or Peterson (2016)). Thus, this research could either confirm or refute the previously held beliefs in learning management technology. The research aims to explore 1) the students' learning outcome characteristics that underline the influence of LMS in learning, and 2) whether Edmodo significantly contributes to the increase students learning outcome in a particular subject.

Flipped Classroom, Edmodo, and Conventional Learning

Flipped classroom is the learning concept that encourages to flip between students activities at home and those of activities at school. It is a pedagogical approach in which the learning is more student-centered rather than teacher-centered (Reyna, 2015). Within the concept of flipped classroom, learning that ordinarily performed at school could be done by students at home individually, while the homework to be finished at school (Bergmann & Sams, 2012). According to Johnson (2013), the flipped classroom is a way that enables teachers to minimize the direct

instructions while maximizing the direct interaction each other. The use of technology is advocated to encourage students to access the course material online. In this regard, the time previously consumed for learning could be released.

Among other Learning Management Systems available in the marketplace, Edmodo is one of the popular learning management systems (Balasubramanian, Jaykumar, & Fukey, 2014). It is a free and secure educational learning network that provides a simple way for teachers to create and manage online classroom community as well as enables students to connect and work with their classmates. Such system facilitates blended-learning (Keene, 2013) that advocates the trade-off between face-to-face time with online activities. Blended courses integrate the best of face-to-face and online learning while reducing the duration of direct interactions in classes. In contrast to the conventional learning processes, course materials are conveyed by teachers through lectures. The teacher determines the content and the learning process has to be done during a specified duration of time.

From students perspective, flexibility is likely one of the strength points of technology aided courses (Forsey, Low, & Glance, 2013). Students are allowed to manage their time to choose which course they should attend on their preferable times. In contrast to conventional courses where students found to be less enjoyable for the strict nature of lessons they could not manage to learn. Due to the efficient and inexpensive cost of its development, conventional learning is easy to be adjusted suits to learner's need. Talent and student's interest, however, are generaly neglected for diversely character of the students

Most of the benefits offered by the flipped classroom concept seem to be the plausible advantages (Milman, 2014), for example, the increase of duration for more engaging instruction in hybrid or blended setting of learning. Teachers adopting flipped classroom, however, should anticipate the drawbacks of this concept such as poor video quality, lack of network connection, or technically incapable operators. Students learning on the flipped classroom should be aware of potential distractions during their study at home.

RESEARCH METHODOLOGY

This research employed Quasi-Experiment approach using the static group pretest-posttest design (Gall, Borg, & P., 1996). The tests were intended to collect learning outcome on the operating system subject. The cognitive domain and observation method were used to collect data of learning the outcome of the operating system of the students in the affective and psychomotor domain.

Instruments trial including 1) validity using point biserial (rpbis) formula, 2) reliability using the formula of Kuder-Richardson (KR.20). Besides that is to be measured of distinguishing features and level of difficulty of questions. Preliminary test or balance test using a t-test, with performing balance test than to be known that between experiment class and control class has the equal ability. Data analysis technique in this research consists of: 1) prerequisite test including normality test using One-Sample Kolmogorov-Smirnov Test, homogeneity test

using Bartlet test. 2) Hypothesis test in this research using t-test to measure differences, and 3) gain index analysis to measure effectiveness. The formula to calculate gain conforms to Meltzer (2002:3).

Result and Discussion

Balance Test

The experiment and control class were tested for the balance average prior to the experiment. The balance test was carried out to determine the preliminary ability of both classes. The employed ***t-test*** indicated the significance level of 5%. The ***tcount*** derived from the significance level was -1,101.

According to theory, if ***tcount***¬ < ***ttable*** both classes fall into the equally preliminary ability categories. While the level of significance of 5% and df 56, the t_{table} score was 2,00.

Based on that result is mean tcount score < ttable. So it can be concluded that between experiment class and control class has the equal preliminary ability.

Normality Test

Normality test to be used to test the distribution of each variable data. Data normality test using Kolmogorov-Smirnov test.

Table 1. Summary of Normality Test Result

Data	Class	Level of Significance α = 5%		Remark
		Count	Condition	
Preliminary Ability	Experiment	0,563	Sig > 0,05	Normal
	Control	,192	Sig > 0,05	Normal

Based on the table above can be seen that significance score more than 0,05. Therefore can be concluded that sample is come from the normal population distribution.

Homogeneity Test

Homogeneity test is to be used to test the similarity of variance between two groups to be compared. In this research, homogeneity test used is Bartlet homogeneity method in the level of significance of 5%.

Table 2. Summary of Homogeneity Test Result

Homogeneity Test	Level of Significance *a* = 5%	Remark

	Count	Condition	
Preliminary Ability	0,071	Sig > 0,05	Homogen

Based on the table above can be seen that significance score more than 0,05. Therefore can be concluded that sample is come from the homogen population distribution.

Hypothesis Test

T-test Learning Outcomes

Statistical techniques were used to examine the differences of learning outcomes is t-test technique. This used to determine the coefficient of difference between two pieces of data distribution.

Table 3. T-test of Learning Outcomes Result

Parameter	Competency	t score		Decision
		t_{count}	t_{table}	
Learning Outcomes	Cognitive	3,709	2.00	Ho rejected
	Affective	0,924	2.00	Ho accepted
	Psychomotor	1,993	2.00	Ho accepted
Accumulation		**2.208**	**2.00**	**Ho rejected**

From the learning outcomes then to be analyzed using t test with the assistance of SPSS 21 with the level of significance of 5%. Summary of t test analysis between experiment class and control class can be seen in Table 3. Based on analysis gained result t_{count} = 2,208 with the real level of 5% and t_{table} = 2,00. Accumulated t_{count} from the average of t_{count} of cognitive, affective, and psychomotor competency. From the t-test analysis, if compared between t_{count} and t_{table} then $t_{count} > t_{table}$ then Ho is rejected, in this matter can be concluded that there is significance differences of learning outcomes of operating system between using *flipped classroom aided edmodo* model and conventional learning.

Gain Index Analysis

The increasing of learning outcomes of the students according to *pretest and posttest* data at the subject of operating system. Calculation of gain index with *Ms Excel Program* and the result can be seen in the Table 5.

Table 4. Gain Index Analysis Result

Learning	Gain	Crite

Model		ria
Flipped Classroom	0,512	Moderate
Conventional	0,288	Low

The gain index analysis of the experiment class indicates 0,512 for Moderate criterion, while the control class is 0,288 fall under Low criterion. The result infered that the application of Edmodo aided flipped classrom increases students' learning outcome in comparison to that of conventional learning.

Discussion

Based on the result of hypothesis test on Table 4 can be seen that tcount > ttable that is mean Ho rejected and Ha accepted, showing that there is differences of learning outcomes of operating system of Class X between the students who get flipped classroom aided edmodo learning model with the conventional learning.

From the result of average of learning outcomes scores of experiment class was obtained of learning outcomes higher than control class. To test the hypothesis of learning of operating system with flipped classroom aided edmodo learning model with conventional learning given evaluation through test in the cognitive competency and observation in the affective and psychomotor competency during learning activity. Learning outcomes of students in the experiment class obtained average score 72,07 and average score in the control class is 65,88. From the analysis obtained showed that tcount = 2,208 with the level of significance 0,05 and ttable is 2,00. Criteria of t if tcount > ttable then Ho will be rejected, so can be concluded that there is significance differences of learning outcomes between using flipped classroom aided edmodo learning model with conventional learning. The result of that analysis prove that learning outcomes using flipped classroom aided edmodo learning model is better than conventional learning.

The Effectiveness of Using of Flipped Classroom Aided Edmodo Learning Model in Increasing of Learning Outcomes of Operating System of Class X Students of SMK Negeri 1 Banyudono. Based on the result of analysis on Table 5 can be seen that gain index analysis in the experiment class using flipped classroom aided edmodo learning model is 0,512 in the moderate criteria. While in the control class using conventional learning is 0,288 in the low criteria. Therefore, it can be concluded that using of flipped classroom aided edmodo learning model is more effective than conventional learning to increase learning outcomes of operating system of the students of Class X SMK Negeri 1 Banyudono.

As long as the research taken place, students in experiment class who get flipped classroom aided edmodo learning model tend to be more active in the learning activity both in the classroom and outside the class, and with supporting of platform edmodo the students in experiment class get more times to learn efficiently. The students in experiment class more often perform the discussion about the installation of operating system material of operation open source through question and answer with teacher both in the classroom and outside the class, therefore the difficulties experienced by the students during the learning can be discussed more intense. This does not seem in the control class using

conventional learning because of limitation in the teaching learning process that most of them to be performed in the classroom only.

Flipped classroom model is a model in the teaching learning process as unusual, in the learning process the students learn material learning at home before class commenced, while teaching learning process in the classroom is doing tasks, discussion about material or the issue is not being understood yet by the students. By doing the tasks in the school can be expected that when the students experience difficulties can be consulted with their friends or the teacher directly, therefore the problem can be solved directly. Through flipped classroom model the students can learn from the video tutorial given by teacher, so the students do not get bored in the studying because of listening the explanation from the teacher only. While the difficulty in using of flipped classroom learning model is how to monitor the students to make sure that during at home the students was studying or not. Besides that the students mental of Class X was shame in questioning in the classroom forum opened in nature that obstruct the researcher in performing the coordination or sharing with the students in relation with the difficulties experienced by the students in studying. That difficulty can be solved with performing sharing to the students personally, so the students feel comfort in consultation the learning material with the teacher, so the difficulties of the students in studying can be overcome.

conclusion

Based on the problem statement, aim of the research, hypothesis proposed and analysis of data research can be concluded as following:

1. There was difference of learning outcomes at the subject of operating system in the Class Teknik Komputer dan Jaringan between the students who get *flipped classroom* aided *edmodo* learning model and conventional learning viewed according to the cognitive, affective and psychomotor competency. t_{count} gained result is 2,208 while t_{table} is 2,003, so that Ha is accepted and Ho is rejected. Therefore *flipped classroom* aided *edmodo* learning model is better than conventional learning.
2. Students of the *Edmodo* aided flipped classroom exhibits the higher performance in the test relative to the control class within the same subject. The ability to rewind the video of read the lesson material thoroughly on students' individual pace could be the main reason. In comparison to the teacher centered conventional learning technique in the control room. However, further exploration on the characteristics supportive to the performance gain was not possible due to the lack of qualitative data gathered during observation.

REFERENCES

Abeysekera, L., & Dawson, P. (2014). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher Education Research & Development, 34*(1), 1-14. doi: 10.1080/07294360.2014.934336

Bakr, M. M., Massey, W. L., & Massa, H. M. (2016). Flipping a Dental Anatomy Course: A Retrospective Study Over Four Years. *Education Research International, 2016*, 1-9. doi: 10.1155/2016/7097398

Balasubramanian, K., Jaykumar, V., & Fukey, L. N. (2014). A Study on "Student Preference towards the Use of Edmodo as a Learning Platform to Create Responsible Learning Environment". *Procedia - Social and Behavioral Sciences, 144*, 416-422. doi: 10.1016/j.sbspro.2014.07.311

Basal, A. (2015). The Implementation of a Flipped Classroom in Foreign Language Teaching. *Turkish Online Journal of Distance Education, 16*(4), 10.

Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Students in Every Class Every Day*

Forsey, M., Low, M., & Glance, D. (2013). Flipping the sociology classroom: Towards a practice of online pedagogy. *Journal of Sociology, 49*(4), 471-485. doi: 10.1177/1440783313504059

Gall, M. D., Borg, W. R., & P., G. J. (1996). *Educational Research: An Introduction* (6th ed.). United States: Longman Publishers USA.

Ginting, A. (2008). *Esensi Praktis Belajar dan Pendekatan*. Bandung: Humaniora.

Johnson, G. B. (2013). *Student Perception of The Flipped Classroom.* (Master of Arts), University of British Columbia, Okanagan.

Keene, K. (2013). Blending and Flipping Distance Education. *Distance Education, 10*(4).

Milman, N. B. (2014). The Flipped Classroom Strategy: What Is it and How Can it Best be Used. *Distance Learning, 11*(4), 3.

Standar Proses: Untuk Satuan Pendidikan Dasar dan Menengah, (2007).

Peterson, D. J. (2016). The Flipped Classroom Improves Student Achievement and Course Satisfaction in a Statistics Course. *Teaching of Psychology, 43*(1), 10-15. doi: 10.1177/0098628315620063

Pierce, R., & Fox, J. (2012). Vodcasts and Active-Learning Exercises in a "Flipped Classroom" Model of a Renal Pharmacotherapy Module. *American Journal of Pharmaceutical Education, 76*(10).

Reyna, J. (2015). ACTIVE LEARNING AND THE FLIPPED CLASSROOM. *Training and Development*.

Roehl, A., Reffy, S. L., & Shannon, G. J. (2013). The Flipped Classroom an Opportunity to Engage Millenial Students Through Active Learning Strategies. *JFCS, 105*(2), 7.

Schultz, D., Duffield, S., Rasmussen, S. C., & Wageman, J. (2014). Effects of the Flipped Classroom Model on Student Performance for Advanced Placement High School Chemistry Students. *Journal of Chemical Education, 91*(9), 1334-1339. doi: 10.1021/ed400868x