The Influence of Learning Strategy (Blended Learning and Expository) and Prior Knowledge on Information Technology and Communication (ICT) Learning Outcomes

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Abstract. The objectives of this research are to determine the effect of learning strategies (blended learning and expository learning) and prior knowledge on ICT outcomes. This research conducted at SMA Methodist Tanjung Morawa during September to November 2016, and used a quasi-experimental method with a 2x2 factorial treatment by level design. The participants were 26 students divided into two treatment classes. Data analysis showed that variance with significance level 0,05. The results indicated that; student's ICT outcomes who used blended learning was better than expository learning; student's ICT outcomes who had higher prior knowledge was better than student's in lower prior knowledge; there is an interaction between learning strategy and prior knowledge; student's ICT outcomes who used blended learning was higher than expository learning to the student group of higher prior knowledge; and student's ICT outcomes who used blended learning was lower than expository learning to the student group of lower prior knowledge.

Keywords: blended learning, expository learning, prior knowledge, ICT

1. Introduction

Nowadays, Indonesian education is continuously making various improvements. Therefore, the use of ICT should be a strategic program that is used to support the teaching and learning process in the classroom. The teachers are not only faced with the problems of improving the quality and quality of Education for their students, but also for themselves as educators to have the competence and self-efficacy in utilizing ICT as a learning media. The teacher as a facilitator should prepare a learning strategy to make the students to be able to understand and to master the materials provided.

ICT subject is a new subject included in the curriculum of the national Education system in 2006 which is called the Education Unit Level Curriculum (KTSP). With the rapid development of technology in various aspects of life, now it has become an academic lesson in ICT 4.0 introduced, practiced and mastered by students in the academic world with a very rapid change, what is now that has entered the era of the industrial revolution 4.0. In the face of such rapid change, it requires the ability and willingness to learn all the way through life quickly and intelligently. ICT results help a lot of people to learn quickly. Therefore, ICT is not only utilized

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in daily life, but ICT also can be utilized for learning process that ultimately adapt students to education in the environment and the work world.

Based on the observation, it was seen that ICT learning had not been carried out with the right learning strategies. ICT learning in general was conducted by using lecture method and learning resource was only book. Learning time was also more widely used by teachers to explain the concepts and principles in ICT learning rather than the students were educated to learn and to do their own duties. By having the rapid development of technology in various aspects of life, now students have to mastered Information Technology and Communication.
Generally, learning is an activity that expects behavioral change in the individual concerned. Learning is influenced by a variety of factors such as: learning material, instrumental factors, environments and individual conditions of learning [1]. Therefore, by providing appropriate learning strategies, students are expected to learn better.

Learning understanding must have three points: (1) long-term; (2) cognitive changes that are seen in changes in behavior such as those from the unknown process; and (3) depends on the experience of the students in other words how the participants of the education or in other words how the participants understand what happened [2].

Learning strategy that can provide solutions in learning problems are blended learning strategy. Blended learning is the combination of instruction from two historically separate models of teaching and learning: Traditional learning system and distributed learning system. It emphasizes the central role of computer-based technologies in blended learning [3]. Blended learning is the most logical and natural evaluation of our learning agenda [4]. It suggests an elegant solution to the challenges of tailoring learning and development to the needs of individuals. It represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning. It can be supported and enhanced by using the wisdom and one-to-one contact of personal coaches. However, blended learning is (1) combining or mixing web-based technology to accomplish an educational goal; (2) combining pedagogical approaches (e.g. constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology; (3) combining any form of instructional technology with face-to-face instructional-led training; and (4) combining instructional technology with actual job tasks [4].

Learning strategies that also play an important role in this research are expository learning strategies. The expository learning strategy is known with the term direct learning strategy [6]. Through this strategy the teacher conveys the lesson of structured learning with the expectation that the teaching material delivered can be mastered by the student well [7]. Direct instruction has been use by researchers to refer to a pattern of teaching that consists of teacher's explaining a new concept or skill to students, having them test their understanding by practicing under teacher direction and encouraging them to continue to practice under teacher guidance [8].

Prior Knowledge is one of the factors that influence learning outcome prior knowledge is a knowledge that students already have before learning takes place which is a prerequisite for following the Research process [9]. Prior knowledge is a set of skills that should be owned by students before they follow the new learning process. The prior knowledge that students must have before they start learning is related to knowledge, skills and attitudes [10]. Prerequisite skill as "the thinking of a person needs to be known" before someone is in position for another learning [11].

The Research of research was about learning strategy using blended learning with expository learning used by teacher toward the students' knowledge about the materials delivered by the teacher.

The formulation of the problems in this research were as follow: (1) as a whole, were there any differences in ICT student learning outcomes that used blended learning strategies versus students who used student learning strategy; (2) Was there an interaction effect between learning strategies (blended learning and expository) with initial knowledge (high-low) on ICT learning outcomes; (3) Were there differences in ICT student learning outcomes that used blended learning strategies versus students who used expository learning strategies, on students who have high knowledge; (4) Were there differences in students' ICT learning outcomes using blended learning strategies versus students using expository learning strategies, on students who had low prior knowledge.

The Research is aimed to determine the effect of learning strategy (blended learning and expository) and prior knowledge on ICT learning outcomes.

2. Research Method

This Research conducted a quasi-experimental method through treatment design by level 2x2. The research variable consisted of one dependent variable which was ICT learning outcomes and two independent variables namely learning strategy (blended learning and expository) as the treatment variables toward prior (high-low) knowledge that was as moderator / attribute variable.

Time and Place of the Research

The Research was conducted at SMA Swasta Methodist Tanjung Morawa. The Research was conducted at the eleventh-grade students. It was conducted for semester 1 of 2016/2017 year. The research activities began in the month of September-November 2016.

Data Source

The target population of this research was all of the students of SMA Swasta Methodist Tanjung Morawa as many as 104 students. The study was assigned to the eleventh grade students through a technique of positive purposive sampling with the tenth grade students who were not learning ICT lesson. While the twelfth-grade students were not permitted to learn ICT since they would face the National Final Examination (UAN). For the total analysis of 64 students the experiment and control groups were taken 27% of the student limit 52 and 27% of the lower student limit 52. Thus, the total samples of 64 students were contributed toward each 16 students.

Data analysis technique

The analysis technique data used was the analysis of variance (ANOVA) which continued by using the Tukey test [12]. Before the hypothesis test the analysis requirements were conducted which consisted as follow: (1) normality test; and (2) homogeneity test.

3. Results

Descriptive statistical analysis of the research results was presented in Table 1.

Table 1. Descriptive Statistical Analysis of Research Data
Descriptive Statistics
Dependent Variable: Learning Outcome

Strategy	Prior Knowledge	Mean	Std. Deviation	N
BL Strategy	High PA	81.9692	9.26308	13
	Low PA	68.4785	6.58846	13
	Total	75.2238	10.45668	26
DI Strategy	High PA	68.8200	7.41848	13
	Low PA	72.0646	7.98456	13
	Total	70.4423	7.73013	26
Total	High PA	75.3946	10.60929	26
	Low PA	70.2715	7.40142	26
	Total	72.8331	9.41906	52

Hypothesis test in this research was related to: (1) the main effect, namely SPBL (A1), SPE (A2), High PA (B1), and low PA (B2); (2) the interaction effect, between SP and PA; and (3) the influence of simple effect. The calculations result using ANOVA was presented in table 2.

Table 2. Summary of Hypothesis Test using ANOVA
Tests of Between-Subject Effects

Dependent Variable: Learning Outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1548.655[a]	3	516.218	8.326	.000
Intercept	275842.169	1	275842.169	4449.074	.000
Strategy	297.220	1	297.220	4.794	.033
PA	341.197	1	341.197	5.503	.023
* PA Strategy	910.238	1	910.238	14.681	.000
Error	2975.995	48	62.000		
Total	280366.819	52			
Corrected Total	4524.650	51			

a. R Squared = .342 (Adjusted R Squared = .301)

The hypothesis calculation showed that there was an interaction between SP and PA, then it was carried out further by using the Tukey test. Tukey test result presented on Table 3.

Table 3. The summary of Tukey test Multiple Comparisons

Dependent Variable: Learning Outcomes
Tukey HSD

(I) Interaction	(J) Interaction	MeanDifference (I-J)	Std. Error	Sig.	95%Confidence Interval	
					Lower Bound	Upper Bound
A1B1	A1B2	13.4908*	3.08844	.000	5.2713	21.7103
	A2B1	13.1492*	3.08844	.001	4.9297	21.3687
	A2B2	9.9046*	3.08844	.012	1.6851	18.1241
A1B2	A1B1	-13.4908*	3.08844	.000	-21.7103	-5.2713
	A2B1	-.3415	3.08844	1.000	-8.5610	7.8779
	A2B2	-3.5862	3.08844	.654	-11.8056	4.6333
A2B1	A1B1	-13.1492*	3.08844	.001	-21.3687	-4.9297
	A1B2	.3415	3.08844	1.000	-7.8779	8.5610
	A2B2	-3.2446	3.08844	.721	-11.4641	4.9749
A2B2	A1B1	-9.9046*	3.08844	.012	-18.1241	-1.6851
	A1B2	3.5862	3.08844	.654	-4.6333	11.8056
	A2B1	3.2446	3.08844	.721	-4.9749	11.4641

Based on observed means.
The error term is Mean Square (Error) = 62.000.
*. The mean difference is significant at the .05 level.

ICT learning outcomes difference of students using SPBL and SPE

Based on the ANOVA calculation (Table 2) on the intermediate source A, it showed that total F_{count} of 4,794> total F_{table} namely 4,23 on $\alpha = 0.05$ (26,1), H_0 was rejected, and H_1 was accepted. It meant that there was the difference in ICT learning outcomes between students taught by the SPBL and the SPE. It was proven by the average learning outcomes of the students group taught with SPBL $Y_{A1} = 75.22$ and the students groups taught with SPE $Y_{A2} = 70.44$. Thus, students' ICT learning outcomes taught with SPBL were higher than SPE.

Difference between high and low PA of students' ICT learning outcomes.

Based on ANOVA calculation result (Table 2) on the source of variable B, it showed that the F_{count} was 5,503> F_{table} total was 4, 23 on $\alpha = 0.05$, H_0 was rejected, and H_1 was accepted. , it meant that there is difference of ICT learning outcomes between students who had high and low PA. On the other hand, the acquisition of student learning group that has PA in average of $Y_{B1} = 75.39$ more than the average of students who had PA with an average $Y_{B2} = 70.27$. Thus, students' ICT learning outcomes which had a higher GPA were better than students who had a lower GPA.

Interaction between SP and PA toward ICT learning outcomes (interaction effect)

Based on ANOVA calculation (Table 2) on the source of variance A x B showed that the total was calculated = 14,681> $F_{table} = 4.23$ on $\alpha = 0.05$, H_0 was rejected, and H_1 was accepted. It means that the SP had an influence on ICT learning outcomes depending on the PA, as opposed to reverse. The interaction graph was shown in Figure 1.

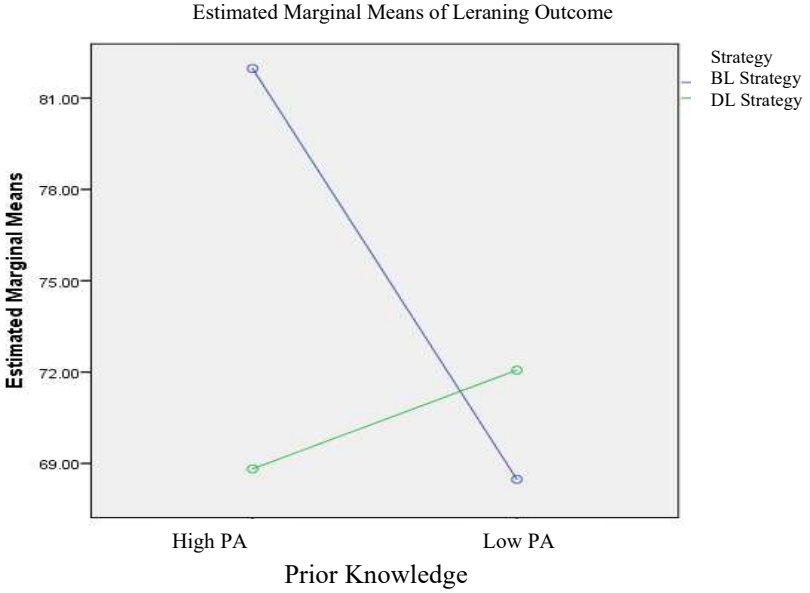

Fig 1. Graph of SP and PA interaction on ICT learning outcomes

The differences of students' ICT learning outcomes taught by using SPBL and SPE, in students who had a high PA (simply effect).

The results of further tests in Table 3 for A1B1 with A2B1 obtained Sig values 0.001 <0.05, H_0 was rejected and H_1 was accepted, with a value of $Y_{(A1B1)} = 81.97 > Y_{(A2B1)} = 68.82$, thus the ICT learning outcomes of students using SPBL were higher than the students' learning outcome values using SPE whose was high PA.

The difference of students taught by using SPBL and SPE, in students who had low PA (simple effect)

Based on the result of further test using the Tukey test in Table 3 for A1B2 with A2B2 values obtained Sig 0.654> 0.05, H_0 was rejected and H_1 was accepted. Therefore, there was a significant difference in the ICT learning outcomes of students who used SPBL and SPE in students who had a low PA. On the other hand the average value of $Y_{(A1B2)} = 68.48 < Y_{(A2B2)} = 72.06$. However, the statistical difference was not valuable. Thus, it could be concluded that there was not the difference of ICT student learning outcomes taught by the SPBL or SPE, for students who had a low PA.

The difference of students' ICT learning outcomes with high and low PA, and the students taught through SPBL

Further test result through the Tukey test in Table 3 for A1B1 with A1B2 obtained Sig values 0,000 <0.05, H_0 was rejected and H_1 was accepted, with value Y (A1B1) = 81.97> Y (A1B2) = 68.48. Thus, the students 'ICT scores were high and low were was accepted, with a value of Y (A1B1) = 81.97> Y (A1B2) = 68.48, thus there was the difference of the students' ICT whose high and low PA taught by using SPBL.

Difference of student ICT learning outcomes with had high and low PA, on students taught by using SPE

The result of the test continued by Turkey test in Table 3 for A2B1 with A2B2 obtained Sig values 0.721> 0.05, H_0 was accepted and H_1 was rejected, with $Y_{(A2B1)} = 68.48 < Y_{(A2B2)} = 72.06$. Even though the average of A2B1 < A2B2 however the statistics was not significantly different. Thus, the result taught by the SPE did not have any difference.

4. Conclusion

Based on the results of the study, it could be concluded as follows: (1) the student ICT learning outcomes who used SPBL higher compared to SPE. Thus the SPBL was able to have a better impact on improving students‘ ICT learning outcomes; (2) the students‘ ICT learning outcomes who had high PA had better learning outcomes compared whose lower PA; (3) there was interaction between SP and PA toward ICT learning outcomes.

Therefore, the students‘ ICT learning outcomes were taught with the SPBL was different from the students who in lowest PA, it meat that SP and PA are two factors that determine ICT learning outcomes; (4) There was difference in students' ICT learning outcomes that was reflected in the use of SPBL with the high-level students with their student learning and by using SPE with the lowest PA; (5) There was differences in students' ICT learning outcomes taught by using the SPBL and having high PA with learning outcomes taught by using SPE and having low PA.

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