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
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

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**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Prior Knowledge</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL Strategy</td>
<td>High PA</td>
<td>81.9692</td>
<td>9.26308</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Low PA</td>
<td>68.4785</td>
<td>6.58846</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>75.2238</td>
<td>10.45688</td>
<td>26</td>
</tr>
<tr>
<td>DI Strategy</td>
<td>High PA</td>
<td>68.8200</td>
<td>7.41848</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Low PA</td>
<td>72.0646</td>
<td>7.98456</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70.4423</td>
<td>7.73013</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>High PA</td>
<td>75.3946</td>
<td>10.60929</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Low PA</td>
<td>70.2715</td>
<td>7.40142</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>72.8331</td>
<td>9.41906</td>
<td>52</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>1548.655</td>
<td>3</td>
<td>516.218</td>
<td>8.326</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>275842.169</td>
<td>1</td>
<td>275842.169</td>
<td>4449.074</td>
<td>.000</td>
</tr>
<tr>
<td>Strategy</td>
<td>297.220</td>
<td>1</td>
<td>297.220</td>
<td>4.794</td>
<td>.033</td>
</tr>
<tr>
<td>PA</td>
<td>341.197</td>
<td>1</td>
<td>341.197</td>
<td>5.503</td>
<td>.023</td>
</tr>
<tr>
<td>* PA Strategy</td>
<td>910.238</td>
<td>1</td>
<td>910.238</td>
<td>14.681</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>2975.995</td>
<td>48</td>
<td>62.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>280366.819</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 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**

<table>
<thead>
<tr>
<th>(I) Interaction</th>
<th>(J) Interaction</th>
<th>Mean Difference (I - J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A2B1</td>
<td>13.1492</td>
<td>3.08844</td>
<td>.001</td>
<td>4.9297</td>
<td>21.3687</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A2B1</td>
<td>-.3415</td>
<td>3.08844</td>
<td>1.000</td>
<td>-8.5610</td>
<td>7.8779</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A1B2</td>
<td>.3415</td>
<td>3.08844</td>
<td>1.000</td>
<td>-7.8779</td>
<td>8.5610</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A2B1</td>
<td>3.2446</td>
<td>3.08844</td>
<td>.721</td>
<td>-4.9749</td>
<td>11.4641</td>
<td></td>
</tr>
</tbody>
</table>

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 $F_{\text{count}}$ of 4,794 > total $F_{\text{table}}$ namely 4.23 on $\alpha = 0.05$, $H_0$ 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 $F_{\text{count}}$ was 5,503 > $F_{\text{table}}$ 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 $A \times B$ showed that the total was calculated = 14,681 > $F_{\text{table}}$ = 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.
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, H₀ was rejected and H₁ 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, H₀ was rejected and H₁ 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, H₀ was rejected and H₁ 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 meant 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.

5. References


