Prospective Science

by Ciciek Suryani

Prospective Science Teachers' Learning Independency Level on Blended Learning

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Prospective Science Teachers' Learning Independency Level on Blended Learning

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Abstract. This study aims to measure the level of self-directed learning readiness of prospective science teacher students studying with blended learning. This study also investigates the relationship of self-directed learning readiness with students' perceptions of blended learning. This research uses a quantitative method involving 28 students of prospective science teachers in the mathematics faculty and natural sciences at Medan State University. Data were collected using a learning independence questionnaire, which was first validated by two learning experts. Measurement of learning independence is done after students undergo one semester of blended learning. In general, student learning independence is at a moderate level. Analysis based on gender shows that there are no statistically significant differences between men and women in learning independence. This study also revealed that differences in learning outcomes are influenced by the level of learning independence, especially in the "self-control" aspect.

1. Introduction

The development of digital technology affects various aspects of Education including learning strategies. The need for more flexible access to time, speed, ways and efficiency in learning creates innovative learning strategies that involve ICT, such as blended learning. As one of the most popular approaches nowadays, blended learning means integrating teaching in the classroom with online experience [1]. Studies report the positive benefits of blended learning, it accommodate students with different learning needs and interests [2], students being digitally literate enhance the chances of extending their lessons and conversations beyond the classroom [3], also stimulate learning and provide a more collaborative learning experience [4].

ICT-supported learning allows students to learn anything, anytime and anywhere is an advantage that facilitates the learning process. These various advantages, on the other hand, pose challenges for students regarding the character of independence and the spontaneous desire to learn outside the classroom. Moreover, the limitless availability of information requires students to determine the appropriate strategy being able to process their learning is very important [5]. Therefore, students need to develop self-learning abilities as part of the learning process and output.

Research on self-learning has been carried out both in terms of self-regulated learning [6][7][8] or self-directed learning [9][10][11]. These two terms differ from their background, content, and specific perspective [12]. This area of study is increasing along with the popularity of learning involving the web. Studies of self-learning are closely related to the use of ICT-supported learning, at various levels of the proportion of ICT support. Self-learning ability is very related to the use of ICT-supported

learning because it requires control, planning, and evaluation of each individual so that learning is effective.

Blended learning is one of the most popular ICT-based learning models today. One of the advantages compared to fully online learning is the presence of face-to-face meetings that can meet psychological needs. One external factor of self-regulation is the provision of standards used to evaluate one's behavior and the existence of reinforcement from others [13]. This research was conducted to determine the level of independence learning in science education students who learn using blended learning.

2. Research Method

The study was conducted in faculty of mathematics and sciences Universitas Negeri Medan, Indonesia in the first semester of 2019-2020 academic year. This is a quantitative research with a survey method. The population in this study was a third-semester science education student as many as 91. Samples were taken at random as many as 28 students or around 30% of the population. The sample consisted of 6 men and 22 women.

Data were collected using a learning independence questionnaire instrument developed and validated by two education experts. The questionnaire consisted of 20 questions with 4 response choices, namely strongly agree, agree, disagree, and strongly disagree. The questionnaire consists of 3 indicators, namely learning initiatives, self-control and self-confidence. Descriptive data analysis and t-test were performed to see differences in the level of learning independence by gender.

In this research, all data were analyzed using SPSS 23. Data were analyzed descriptively to find out the mean, standard deviation, and the highest and lowest scores. All data are normally distributed as shown in the results of the Kolmogorov-Smirnov test and Sapiro Wilk with Sig. > 0.05. So, to find out the difference in the average of students' independence based on gender, a t-test was performed, and for one-way Anova data based on academic achievement.

3. Result and Discussion

This research was conducted on prospective science teacher students who had undergone one semester of blended learning with a proportion of 60% face to face and 40% online learning. Table 1 shows that 21.4% of participants were men and 78.6% were women. Based on the level of academic achievement, participants consisted of 17.9% high grade, 46.4% middle and 35.7% lower grade.

Table 2 shows the indicator "learning initiative" students have a mean of 77.00 (SD 10.65) with a minimum score of 45.43 and a maximum of 89.29. In the indicator "self-control" the mean is 75.72 (SD 8.80) with a minimum score of 54.17 and a maximum of 90.83. while the "self-confidence" indicator reaches a mean of 75.35 (SD 10.91) with a maximum score of 60.29 and a maximum of 100. Based on this data it can be seen that the independence profile of student learning has a higher tendency towards the "learning initiative" indicator even though it has the lowest minimum score. Based on these data, both in general and per-indicator, student learning independence is at a moderate level.

Table 1. Description of participant data

Variable	Group	n	%
Gender	Male	6	21,4
	Female	22	78,6
	Total	28	100,0
Capaian akademik	High grade	5	17,9
	Middle grade	13	46,4
	Low grade	10	35,7

Tabel 2. Mean and standar deviation for each variables of independency learning

Indicator	Mean	SD	Minimum	Maximum
Learning inisiative	77,00	10,65	45,43	89,29
Self-control	75,72	8,80	54,17	90,83
Self-confidence	75,35	10,91	60,29	100,00
Total learning independency score	76,63	9,77	52,94	89,71

Gender based analysis was carried out to determine whether there were differences in achievement scores for learning independence in male and female students. Table 3 shows the achievement data of learning independence in each indicator of independence by sex. In the indicator of "learning initiative" and "self-confidence" male students tend to have better results, whereas in "self-control" female students are better than men. However, in general the results of the average comparison test using the t test showed that there were no significant differences between male and female students both in general and by indicators. This is indicated by a significance value more than 0.05 ($p > 0.05$). This result has a difference with the Ors study [10] which reports that there are significant differences between genders in the score of self-directed learning readiness (SDLR). Ors reports, female has a statistically higher level of self-directed learning readiness compared to male. This difference can occur due to limitations in this study which has a comparison of the number of male participants far less than the number of females. Nevertheless, the results of this study are in line with the research of Yukselturk and Bulut (2009) who reported that there were no significant differences in the variables of self-regulated learning in online learning environments between men and women [14]. These different results can occur because in general both men and women have different learning strategies in relation to learning independence.

Anova One-way test results on students' learning independence scores with various levels of academic achievement (Table 4) show that there are statistically significant differences. (Sig. 0.04, $p < 0.05$). Analysis of each indicator shows that significant differences based on academic achievement can only be found on the "self-control" indicator with sig. 0.01 while the other two indicators namely "learning initiative" and "self-confidence" each have a sig. 0.75 and 0.28. These results indicate that "self-control" affects the academic achievement of students. In Table 4 it can be seen that students with the "high" grade have the highest "self-control" scores, and the "low" grades have the lowest scores.

Table 3. The results of the T Test of the students' independency learning scores depending on the variable of gender

Indicator	Gender	t-test				
		n	Mean	SD	t	Sig.
Learning inisiative	male	6	80,95	15,26	0,49	0,86
	female	22	77,92	13,02		
Self-control	male	6	75,00	12,36	0,83	0,65
	female	22	70,64	11,09		
Self-confidence	male	6	81,25	12,50	0,09	0,73
	female	22	80,68	13,89		
Total learning independency score	male	6	72,30	5,66	1,09	1,33
	female	22	77,80	2,17		

Table 4. One-way ANOVA test results on differences in academic achievement on each indicator

Indicator	Academic achievement	ANOVA			
		n	Mean	SD	F	Sig.
Learning inisiative	High	5	80,00	10,59	0,28	0,75
	middle	13	77,01	13,51		
	low	10	75,48	6,29		
Self-control	High	5	83,67	7,89	5,52	0,01
	middle	13	76,92	6,90		
	low	10	70,18	8,37		
Self-confidence	High	5	82,50	14,25	1,35	0,28
	middle	13	74,07	11,20		
	low	10	73,42	8,04		
Total learning independency score	High	5	85,65	3,88	3,53	0,04
	middle	13	76,22	10,94		
	low	10	72,65	7,54		

These results indicate that learning independence is related to student academic performance. As part of the learning process, independence in learning is related to the ability of students to plan, monitor and organize their own learning [15]. Furthermore, independent learning, referring to the metacognitive process, motivation and behavior, allows students to focus and control their own learning [16]. Good ability in planning, organizing and evaluating is a learning strategy that will affect learning outcomes. The results of a review of learning independence report that strategies of time management, metacognition, effort regulation, and critical thinking were positively correlated with academic outcomes [17].

Learning independence is an important aspect in supporting the success of 21th century learning, where learning activities are increasingly student-centered and knowledge can be obtained from various sources that can be accessed via the internet. Many studies have examined the independence of learning in relation to online learning [17][18][5]. In Indonesia, research on the use of science-on-web learning reports that learning using a website can increase learning independence and student learning outcomes [19].

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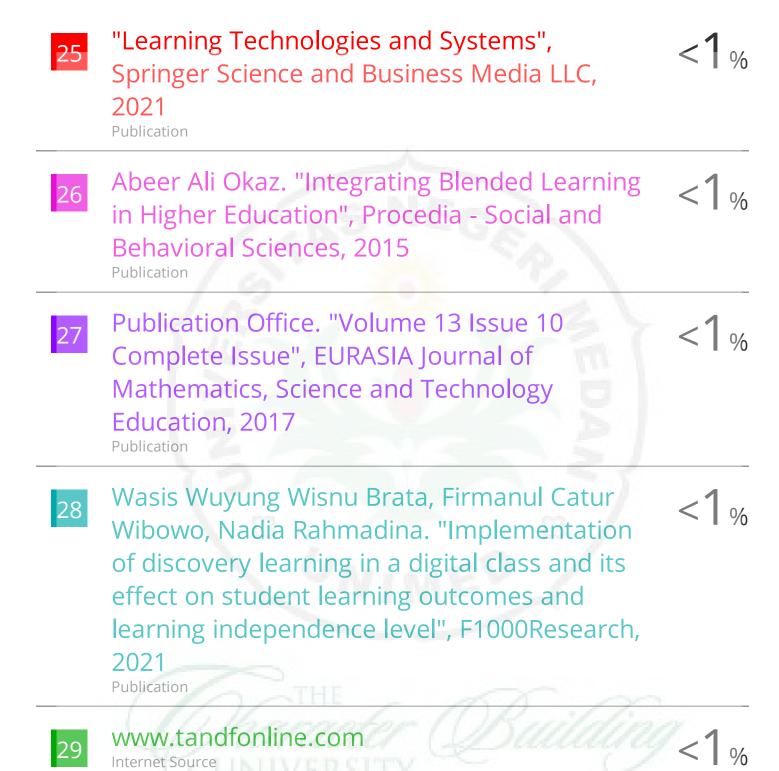
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